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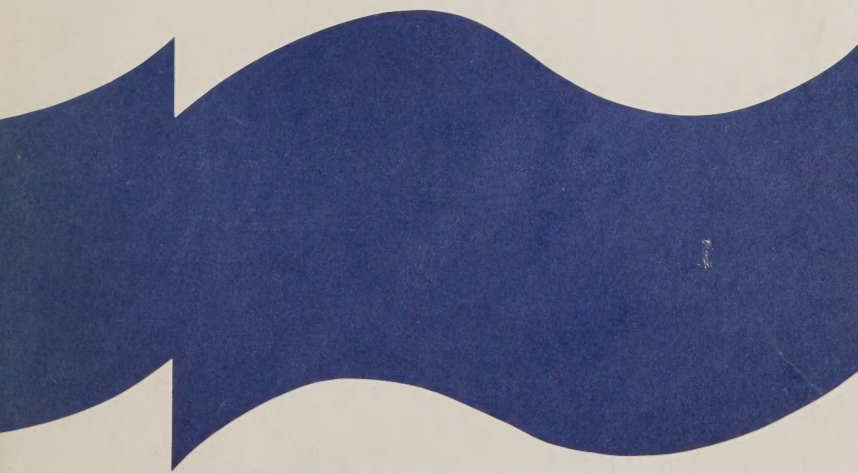
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# **Lectures In Agricultural Economics**

**Bicentennial  
Year Lectures  
Sponsored  
By the  
Economic  
Research  
Service**

U.S. Department  
of Agriculture

Theodore W. Schultz  
Irma Adelman  
Charles E. Bishop  
Karl A. Fox  
George E. Brandow  
D. Gale Johnson  
M.M. Kelso  
Earl O. Heady



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# Lectures on Agricultural Economics

THEORY OF THE FARM  
AND THE MARKET  
CROPS - LIVESTOCK  
AND FISH - FORESTRY  
AND HORTICULTURE  
AND THE RURAL  
INDUSTRY

1917

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## Foreword

Two hundred years ago, in the same year that the United States declared its independence, Adam Smith published *The Wealth of Nations*, probably the most influential economic monograph the world has seen. The growth of the United States over the past two centuries has been paralleled by the development of economics as a profession. Today, the policies adopted by this Nation influence the entire world, while nearly every major policy adopted is influenced by considerations advanced by economists. It seems particularly fitting, then, that the Economic Research Service should commemorate the bicentennial of the Nation's independence by sponsoring a series of lectures by some of the Nation's outstanding agricultural economists.

Agricultural economics has developed as a discrete branch of economics only since the turn of the century. One reason for this may be that from Adam Smith's time to then, agriculture still dominated world economic activity. A review of Smith's *Wealth of Nations*, Ricardo's *Principles*, or Mill's *Principles* indicates that all three assumed that agricultural production was a major factor in the economy, while Malthus' *Essay* reviews the food-population problem in terms that are still used today. In a sense, all economists were agricultural economists during the 19th century.

As the century drew to a close, however, agriculture slipped to a subordinate position in the United States and in the industrial nations of western Europe. Farmers, now a minority, organized and began to demand special consideration. The development of agricultural economics as a separate discipline was one indirect result of this situation.

As the discipline first developed, farm management came to the front, followed by agricultural finance and marketing. Land use also received attention in the early years. During the farm depression of the 1920's and 1930's, price policy attracted many able economists. Since then, use of natural resources, rural development, and other areas have become important. Essentially, as the Nation has changed over the past 200 years to meet its citizens' needs, so agricultural economics has changed over the past 75 years to meet the needs of farmers and of the American public.

To help understand these changes and what they mean to

farmers and the American public as well as to agricultural economics, the Economic Research Service sponsored a series of lectures during 1976 by distinguished leaders representing several areas in the discipline. In honor of our Nation's 200th Year, we named the events our Bicentennial Year Lecture Series. ERS' goals for these lectures were to learn from the experience and foresight of the speakers, to give younger USDA economists an opportunity to see, hear, and meet some of the Nation's most innovative economists, and to call attention to the place of economists in our national life.

I would like to take this opportunity to thank our guest lecturers: Ted Schultz, Irma Adelman, Charles Bishop, Karl Fox, George Brandow, D. Gale Johnson, M. M. Kelso, and Earl Heady. We also appreciate the participation in our ERS-BAE Alumni Day of Don Paarlberg, O. V. Wells, Willard Cochrane, Nathan Koffsky, John Schnittker, M. L. Upchurch, and Walter Wilcox.

*Quentin M. West*  
*Administrator*  
*Economic Research Service*

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## Preface

There is no reason why separate speeches by eight prominent agricultural economists should add up to a consistent whole when bound into a single volume. This collection of talks in the Economic Research Service's Bicentennial Year Lecture Series is no exception. Yet we do expect such a collection to provide us with insights into some of the current issues agricultural economists are facing. That expectation is fully satisfied. In these papers, we find pertinent ideas to help ERS and other agricultural economics research organizations bring into focus current issues related to defining relevant problems, generating useful data, identifying appropriate theory, and understanding the social or political environment in which we work.

The social *problems* of concern in these papers encompass a changing commercial U.S. agriculture, a struggling rural non-farm economy, international trade, and growth in less developed countries. Two papers were devoted almost entirely to heightening our awareness of problems. They both focused on the world, rather than the domestic situation. D. Gale Johnson emphasized the importance of stable, adequate world food supplies and the need for both short-run and long-run solutions. Irma Adelman addressed problems of growth in less developed countries and emphasized that problems associated with inequitable income distribution tend to increase as these nations begin to grow.

*Data* were seen by several of the authors as a source of difficulty. The quantity, price, and value measures developed for U.S. agriculture and closely related sectors during 1922-53 by the former Bureau of Agricultural Economics were cited as an example of good analysts applying good theory to good data. The subsequent demise of some of the data, particularly that related to typical farms and to enterprise budgets, was lamented. Karl Fox addressed his paper almost exclusively to a data problem. He pointed out that to measure the performance of a social system we need direct counterparts to the quantities, prices, and values required to measure economic performance. Fox found the key in a complete accounting for the allocation of time among alternative uses.

Economists have learned that once they have collected data relevant to a problem, useful *descriptions* can precede analyses. There are several examples of this in the papers, including a

descriptive history of natural resource development in the United States. Extensive descriptions are tabulated of the relations of social and economic characteristics in less developed countries to growth and equity.

Economic *theory* to explain and help us understand social problems was of concern in most of the papers. Earl Heady's underlying theme is that good training in theory provides us all with a basis for defining problems, information, and relationships which need continuous re-estimation as markets, technology, and institutions change.

Theodore Schultz finds that the explanation of the rising economic value of human time is not to be found in the theories of Ricardo, Malthus, Marx, or Keynes. He suggests it is to be found in the investment of people in themselves, thus creating human capital. George Brandow uses deductions from economic theory as a basis for operational standards for evaluating performance in the food industry. Maurice Kelso finds conventional economic wisdom to be part of the problem, rather than the solution, to natural resources development and argues for incorporating the role of institutions in our descriptions, analyses, and prescriptions.

Some of the *analysis* and processing of data evidenced in these papers is informal in the sense that the human mind, possibly aided by pencil and paper, is perhaps our most important data processing system. Even so, there is extensive evidence that these authors frequently turn to mathematical models, large data banks, and extensive systems of hardware and software to conduct cross-tabulations, simulations, factor analyses, linear programs, and various econometric studies in their efforts to interpret the data in the light of economic theory.

Public policy *prescriptions* abound in these papers, even though one of the authors explains that involvement in public policy is controversial and that there tends to be a gulf between the academics and the policymakers. Wrong-headed policies are shown in these papers to be, sometimes, a part of the problem. One example is natural resource policies which assume that all one needs to do is to ensure that the channels of communication are open in order to fine tune the economy while assuming away the problems of setting goals, resolving

conflicts, and seeking productive combinations. Another example of policies which complicate, rather than ameliorate, the situation is in the policies of less developed countries which discourage, rather than expand, food production. Some authors used these lectures as a forum for expounding policy prescriptions. For example, a grain reserves policy is outlined as an insurance against short-run fluctuations in world food supplies.

The *environment* in which agricultural economists work receives explicit attention from a few of the authors. There are references to the continual expanding demand for our services and to the responsibilities that a large research organization like ERS has in its influence on professional activities. Ed Bishop addressed most of his lecture to the uncertain support which academicians have received from the public during the last 200 years.

*Clark Edwards*







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# **The Economic Value of Human Time Over Time**

**Theodore W. Schultz**

**Lecture 1  
March 23, 1976**

What have our ideas and institutions contributed to the high value we place on human beings and to the remarkable increases in the value of human time? While it is fitting and proper during this bicentennial year to celebrate our achievements as a Nation, it is much more important to examine critically and to reassess the social, political, and economic ideas embodied in our institutions. Because of the influential books, pamphlets, and documents appearing in 1776, it is convenient to date these ideas accordingly. Although these ideas are a critical part of our social heritage, it will no longer suffice to take them for granted. It is a heritage that is being eroded for lack of support against strong alternative social, political, and economic ideas.

The ERS bicentennial lectures afford an opportunity to examine the interplay between social thought and the political economy—presumably with special reference to the economic history of agricultural productivity; the decline in the social, political, and economic influence of the owners of land; and the rise in the economic value of human time.

What people do privately and collectively over time is con-

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**Theodore W. Schultz**

strained by the consequences of the interactions between ideas and institutions consisting of observable responses of one to the other. In this context, ideas are embodied in social thought, and the social, political, and economic order is maintained by institutions. The response of ideas to the institutionalized order is of two historical types: those that rationalize and contribute to the codification of the prevailing order, and those that arise in protest to the established order which become embodied in social thought and then become strong enough to induce a real alteration in the prevailing institutions.

From the point of view of economics, the consequences of the interactions between ideas and institutions differ markedly from one period to another. It is useful to think in terms of four periods: the mercantile period preceding 1776; the era of economic liberalism that followed; the more recent forms of neo-mercantilism ranging from centrally planned economic development to a system of command economics; and, currently, there are signs of a nascent, neo-liberalism emerging in protest to the various centralized and authoritarian institutionalized orders.

The mercantile system that prevailed for decades, for example in England, prior to 1776 was rationalized by economic ideas. These ideas provided support for governmental restrictions on trade, on internal prices and wages, and on migration. The social and political order was buttressed by the established Church and by the Law.

In protest to the adverse social and economic effects of the then prevailing institutionalized order, 1776 was an extraordinary year in terms of the various intellectual publications that laid the foundation for liberalism. The open competitive economy with people responding to market prices that are not fettered by private or public monopolies in a political order in which the functions of the state are greatly restricted—this was the classic contribution of Adam Smith. Smith's economic ideas complemented the more general liberal thought of his day which over the decades that followed profoundly altered the institutionalized functions of the government.

Liberalism, because of its accommodation of the economic attributes of capitalism as seen in the adverse social effects of industrialization, led in turn to a wide array of protests. The

ideas that emerged from these protests prior to those of Karl Marx called for various forms of socialism. The contributions of Marx, however, came to dominate the political and economic foundations that are required for socialism. The response to Marxian ideas has altered greatly the institutions of many nation states. The economic functions of government are much enlarged, and in this sense it is a new form of neo-mercantilism.

In protest to socialism there now emerges a neo-liberalism which is still no more than nascent as a system of social ideas. Because of the dependency of socialism on a vast increase in the functions of government, which in some countries consists of extreme authoritarian nation states, and because of the now widely observed adverse effects of the governmental institutions on personal freedom, protests akin to those of two centuries ago are once again the order of the day.



*Theodore W. Schultz*

As Professor of Economics at the University of Chicago, T. W. Schultz ranks as one of the Nation's most distinguished and respected economists. Outstanding credentials include five honorary degrees; author of 11 books and editor of six; consultant to the Ford and Rockefeller Foundations, Brookings Institution, five U.S. Government departments, and the President's Economic Council; and advisor to the World Bank and the Food and Agriculture Organization of the United Nations. His wide-ranging interests include world agricultural development, economic implications of research and education, U.S. farm policy, and the economic value of human life.

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**Theodore W. Schultz**

The core of the argument of this lecture does not deal directly with the ideas and institutions of these various economic systems. The historical evidence, however, which I am about to present, does provide some indirect information that gives rise to doubts about the adequacy of classical theory and also of the economic theory of socialism. The economic history to which this paper appeals supports four major propositions that are not at home in either of two long established sets of theories.

The first arises out of the fact that wage and salary workers in high-income countries, and especially in the United States, have become capitalists as a consequence of their large investments in their own human capital. The opportunities and incentives to which workers respond in their investment in human capital is not a part of the theory advanced by Ricardo or that of Marx. Nor is it an integral part of Keynesian economics.

Secondly, contrary to the core of classical economics built on the assumption of the dominating effects of Ricardian Rent on personal income shares, the economic and the associated social and political importance of landlords has in fact declined markedly over time in high-income countries.

Thirdly, contrary to Marx and not anticipated in classical theory, changes over time in the functional distribution of income have had a major effect in reducing the inequality in the personal distribution of income.

Fourthly, given the imprint of Malthus, theory until very recently has been silent on the economics of the decline in fertility in high-income countries. There is still another major implication that is not featured in this paper: the extraordinary decline in the labor force required to produce agricultural products in high-income countries. Regardless of the source or the mode of received theory, this important historical economic development cannot be derived from the theory.

I first present the elements of an economic approach; I then turn to the measurement of the increases in price of human time and to the secular trend in the prices of natural resource materials and rent. Lastly, I consider some of the implications of the high price of human time.

## **An Economic Approach to the Price of Human Time**

Value and capital are the core of economics. Events and human behavior alter the scale of values and the stock of capital. Alterations that enhance the scope of choices are favorable developments. The various forms of capital differ significantly in their attributes. Natural resources are not reproducible; structures, equipment, and inventories of commodities and goods are physical entities that are reproducible; and human beings are productive agents with the attributes of human capital. Human beings are also the optimizing agents and, in a fundamental sense, it is their preferences that matter in the use that is made of the various forms of capital. The concept of human capital, its development and its usefulness, is a recent innovation. In high-income countries, the rate at which human capital increases exceeds that of nonhuman capital.

Despite unfavorable events from time to time, human behavior in high-income countries has brought about a secular increase in the personal stock of human capital, and the increases in it have gone hand-in-hand with the rise in the value of human time. A part of the analytical task is to extend the core of economics to explain the formation and the functions of human capital in the changing context of secular time.

Our knowledge of the economics of the processes that alter the supply of human capital has been advanced during the last two and a half decades. Schooling, higher education, on-the-job experience, migration, and health all contribute to the personal supply. But changes in the supply of human capital are only one of the two major parts of the story in explaining the increases in the economic value of human time. The value that is revealed in the price of human time is the intercept of the prevailing supply of, and the demand for, the market and nonmarket services and for the direct personal satisfactions that people derive from their human capital. Our knowledge of the economic processes that alter the demand for human capital is not nearly as satisfactory as it is with respect to the supply.

To acquire an historical perspective on the unsettled issues pertaining to the price of human time, it is necessary to go

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**Theodore W. Schultz**

beyond current events and recent economic growth. It is useful to recall that the early English classical core of economics rested on the following propositions: a highly inelastic supply of land (natural resources) resulting in Ricardian Rent, population growth resulting in constant (subsistence) wages over time, and the productivity attributed to additional nonhuman capital and advances in useful knowledge (state of the productive arts) result in a larger population and in increases in Ricardian Rent. All household activities were assumed to be unproductive. Accordingly, the economic activities that mattered were confined to market-oriented production activities.

We shall appeal mainly to seven decades of economic history to establish the fact that the price of human time has risen markedly in countries that have developed a modern economy and to establish the additional fact that the secular trend of the real price of the services of natural resources, of both renewable and nonrenewable natural resources, has been essentially horizontal. As a consequence, the economic importance of the price of human time has risen greatly relative to the price of the services of natural resources.

In view of this historical development, how can the following issues be resolved? Why has Ricardian Rent lost its economic sting in these high-income countries? Why have real wages increased so markedly despite population growth? Closely related, why has the demand for human time increased more than the combined quantity and the quality of the supply?

Although it is obvious that the high price of the services of labor cannot be explained by a theory of subsistence wages, nor by a theory of labor exploitation, and furthermore, in spite of the fact that a very large share of our national income accrues to labor, a labor theory of value will not suffice. The extension of the economics of labor that is made possible by the development of the concept of human capital explains in large part the increases in the supply of valuable acquired abilities including skills by means of investment. But, this extension of labor economics, already implied above, does not explain the increases in demand for the services of the human capital that become embodied in our youth and our adult population.

We begin with an appeal to general theory and proceed to



build on the proposition that the value of the services of capital holds the key to the explanations we are seeking. We require for the purpose at hand an all-inclusive concept of capital. Reproducible tangible wealth is only one category of capital. Although natural resources are not reproducible, they are treated here as another category of capital. Human agents are the most important category in this all-inclusive concept of capital consisting of the economic attributes of human capital.<sup>1</sup> The value placed on services of these various categories of capital is revealed in human behavior. A closely reasoned economic theory to explain this behavior rests on two basic concepts: the human being is an optimizing agent whose behavior is governed by constraints that are in part peculiar to him, and the market provides the auction at which all individual offers are acknowledged and the terms of trade are established for equalizing supply and demand.<sup>2</sup>

Our approach to the increases in the value of human time concentrates on the changes in the supply and demand intercepts over time. The variables that alter the supply of human time are fairly clear: total hours devoted to market and non-market activities, including hours allocated to consumption; composition of the hours of the population that engages in these various activities; and quality of these hours. These supply variables are interdependent in their responses to the hourly price and to the income effects of that price.

Given the state of economics, the variables that alter the demand for human time are not wholly clear. The amount and the price of the services of natural resources and the effects of this price on wages have been integral to economics since the early classical period. They form one of the variables that matters though not behaving in accordance with that theory. Moreover, effects of the rent derived from natural resources on the demand for human time are small in high-income countries. The stock of nonhuman reproducible capital, the price of its services, and the forms of this capital constitute a major variable in their influence on the demand for human time. The effects of the income from this category of capital on the demand for human time are still substantial even though the income from this source has declined much relative to the income earned by labor. Another variable of increasing

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importance over time is the demand for the personal services of professional and competent technicians by families who derive their income from wages and salaries.

The approach advanced here requires an additional critical variable. It consists of changes in the arts of production and consumption that occur as a consequence of advances in useful knowledge. This variable has two important specific economic attributes. In the case of natural resources, it consists of new *man-made substitutes* for such resources. In the domain of reproducible physical capital, it consists of new forms of such capital which are *complementary* with high human skills and which for this reason increase the demand for such human capital and the value of human time.

We now turn to the task of marshalling some of the historical evidence on the extent of the secular rise in the price of human time, concentrating on the period since 1900.

### Measurement of the Price of Human Time

For most people throughout the world, economic conditions are such that the value of their time is very low. Labor earns a pittance. Work is hard; life is harsh. Countries with low earnings cover most of the world's map. In a few countries, however, the value of the time of the rank and file of people is by comparison exceedingly high. The high price of human time that characterizes these exceptional countries is from the viewpoint of economic history a recent development. In Ricardo's day, land rents were indeed high relative to wages. During Marshall's period, real wages were a small fraction of what they have become since then. In the United States, for example, between 1900 and 1972, the *real* hourly "wages" in 1967 dollars in manufacturing rose from about 60 cents to \$3.44.<sup>3</sup>

We begin with an overview of the secular increases in the economic value of human time. The direct evidence consists of estimates of real wages covering the period since 1900 by decades. Starting with the United States, we use Rees' NBER (National Bureau of Economic Research) estimates of the compensation *per hour* at work for manufacture production workers as a proxy of the price of human time in the market sector. The real hourly

price rose during each of the decades. By 1972, the real compensation per hour had risen more than fivefold. As would be expected, the annual estimates show several years when a decline occurred. There were 3 such years before World War I and 8 since then.<sup>4</sup> The marked upward trend, however, is shown in table 1.

The upward trends in real wages in industry in France, Germany, Sweden, and the United Kingdom (table 2) are, in general, much like that of the United States. They differ somewhat, however, in that the rate of increase is higher in Sweden and the United States than it is in the other three up to about 1960, except for the United Kingdom which did not stay abreast of the rest. There are also other country differences in the movement in real wages that are noteworthy. France and the United Kingdom show no increase between 1900 and 1910. As of 1925, Sweden and the United States were substantially ahead of the other three countries (was it a consequence mainly of differences in the effects of the aftermath of the war?). Sweden and the United States maintain their advantage over the others up to 1960 with the United Kingdom losing ground relative to the rest. Lastly, during the decade of the sixties, France and Germany join Sweden and the United States in showing approximately a fourfold increase in real wages over the period from 1900 to 1970, whereas the increase for the United Kingdom is threefold.

The fact that real wages rose as much as they did implies strongly that the various prices other than the price of human time which enter into the deflator of actual wages declined relative to wages. Because of the stress placed on land rent rising as capital is accumulated and population increases over time in classical theory, and the concern about the "unearned" income of landlords in both liberal and socialist thought, we turn to the trend in the prices of the services most dependent on natural resources along with a comment on Ricardian Rent on farmland.

### **Prices of Natural Resource Materials and Rent**

Our aim here is to present evidence on the trends in the prices of these materials. We shall concentrate on the com-

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**Table 1—Total work compensation per hour of manufacturing production workers, United States, 1900–1972**

Year	Rees' wages	1900=100
	1967 dollar	Index
1900	0.60	100
1910	.70	117
1920	.92	153
1930	1.06	177
1940	1.60	267
1950	2.15	358
1960	2.85	475
1970	3.27	545
1972	3.44	573

Source: Albert Rees, *Long Term Economic Growth, 1860–1970*. U.S. Bur. Econ. Analysis, Washington, D.C.: 1973, App. 2, B70, pp. 222–223. Note: Estimates for 1970 and 1972 are derived using a similar method. Rees' estimates are adjusted from 1957 to 1967 dollars.

modities that are most closely identified with natural resources because of the widely held belief that natural resources are the critical limiting factor available to the economy. We consider renewable natural resources (agriculture and forestry) and non-renewable natural resources (mining including mineral fuels) and we examine the trends in the prices of the commodities from these sources. We shall refer to this natural resource complex as the extractive industries. The commodity prices that we present are of course not pure material prices; far from it, for they embody in various combinations the productive service of labor and of reproducible capital along with the material component.

Accordingly, our concept of the extractive industries encompasses mining (of which metals and mineral fuels are the dominant components) and agriculture and forestry. Most of the commodities produced by these industries tend to remain quite constant over time in their physical, chemical, or biological attributes. A bushel of wheat, for example, produced in 1900 differed little from a bushel produced in 1970. Similarly constant are such commodities as lead, copper, or sulphur.

**Table 2—Indexes of real wages in industry in France, Germany, Sweden, United Kingdom, and the United States, 1900–1970**

Year	France	Germany	Sweden	United Kingdom	United States
		1890–99=100			
1900	112	108	110	104	110
1910	112	116	131	104	121
1925	135	127	158	113	160
1930	138	156	183	124	160
1938	142	155	190	133	203
1950	168	174	252	169	292
1960	290	282	343	219	381
1970	442	482	473	301	446

Source: E. H. Phelps Brown, "Levels and Movements of Industrial Productivity and Real Wages Internationally Compared, 1860–1970," *Economic Journal*, 83, 58–71. Based on tables III and V of the appendix. Note: In interpreting the increases in real wages shown in table 2, it should be borne in mind that we are now dealing with real annual wages in industry. They are not hourly wages. They are less complete in getting at the total compensation of employees than the estimates by Rees. Accordingly, Rees' estimates show a higher rate of increase than Brown's. Thus, for the United States during the period from 1900 to 1970, Brown's real wages show a fourfold increase and Rees' real hourly "wages" a strong fivefold rise.

Quality changes occur, however, in such commodities as milk and other livestock products. Historical records of these commodity prices are, in general, more reliable than that of final and intermediate goods. For the United States, we have the excellent study by Potter and Christy<sup>5</sup> of commodities produced by extractive industries covering the period beginning soon after the Civil War with annual estimates up to the mid-fifties. The Potter-Christy study has been updated by Manthy.<sup>6</sup>

The empirical story as told in table 3 is that the trend of the deflated natural resource commodity prices over this period was not upward but slightly downward,<sup>7</sup> compared to the more than fivefold rise in real hourly wages shown in table 1. Within agriculture, the deflated prices of all crops declined about a third despite various government price supports during parts of

## Theodore W. Schultz

Table 3—Indexes of deflated commodity prices of the extractive industries, United States, 1900–1972

Year	All commodities	All agriculture	All forestry	All metals
		1900=100		
1900	100	100	100	100
1910	99	126	99	76
1920	109	111	97	66
1930	76	90	56	45
1940	77	86	87	60
1950	108	131	99	68
1960	87	95	90	75
1970	79	88	74	76
1972	83	92	84	71

Sources: N. Potter and F. T. Christy Jr., *Trends in Natural Resource Commodities*. Baltimore: Johns Hopkins Press for Resources for the Future, 1962. Actual prices are weighted by the value of output, updated using 1967 weights by Robert S. Manthy, Mich. State Univ. Indexes of actual prices are deflated by the consumer price index, 1967=100.

this period. The index for all livestock closes out this period at the level where it began (table 4). In general, the costs of producing livestock products have been affected more by the increase in the price of human time than have the costs of producing crops. The deflated prices of mineral fuels shown in table 5 tell us that, whereas the deflated price index for all mineral fuels was about a fourth less at the end of this period compared to 1900, the price of bituminous coal rose and that of petroleum fell. It is undoubtedly true that the rise in real wages accounts for a good deal of the increase in coal prices.

We have not used economic theory in mapping the course of natural resource commodity prices. Nor have we used theory to gain plausibility or to derive testable hypotheses, nor to validate the reported behavior of these prices over time. Our reason for this apparent non-theoretical approach to the factual data is that there is no general economic theory that encompasses the type of development here under consideration. There are conflicting theories of the substitution among capital, labor,

**Table 4—Indexes of deflated agricultural commodity prices, United States, 1900–1972**

Year	All agriculture	All livestock	All crops
1900=100			
1900	100	100	100
1910	126	127	118
1920	111	118	87
1930	90	99	73
1940	86	95	73
1950	131	141	110
1960	95	101	75
1970	88	100	66
1972	92	104	69

Sources: See table 3.

**Table 5—Indexes of deflated commodity prices of metals and of mineral fuels, United States, 1900–1972**

Year	All metals	All mineral fuels	Petroleum	Natural gas	Bitu- minous coal
1900=100					
1900	100	100	100	100	100
1910	76	48	42	—	93
1920	66	118	131	118	146
1930	45	61	59	114	79
1940	60	59	57	80	104
1950	68	81	84	68	156
1960	75	79	79	119	125
1970	76	72	68	111	125
1972	71	73	67	112	143

Sources: See table 3.

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and natural resource commodities used by the industrial sector.<sup>8</sup> There are some studies of the value of the amenity services relative to the value of commodities from the same natural resources.<sup>9</sup> Going back, there is what was then considered to be a general theory with built-in Ricardian Rent.

Received theory at the turn of the century predicted that the price of natural resource commodities would rise relative to wages and that the rental income accruing to the owners of natural resources would become an increasing share of national income. No less an authority than Marshall presents this prediction cogently and strongly in the preface to the 8th edition of his *Principles of Economics*. The observed course of natural resource commodity prices, including the price of food produced by agriculture, is obviously not consistent with Marshall's prediction. Furthermore, as we show presently, his prediction with regard to rentals on agricultural land is also inconsistent with the evidence since his day.

There is no general theory for the task at hand. Our recourse is at this point limited to partial theories of the demand for and supply of natural resource commodities and of the amenity services derived directly from nature. A good deal is known empirically about the income elasticity of consumer demand for various farm goods, for material goods, and for some of the amenity services of nature. Theory and evidence about price elasticities of the demand pertinent here are not especially useful in analyzing developments that occur over decades.

In thinking about nonrenewable natural resources, the common sense perception of their eventual exhaustion or permanent impairment as a source of amenities is not in dispute. With regard to renewable natural resources, the ultimate limits of the surface of the earth suitable for growing crops and trees on which agriculture and forestry depend are also not being called into question. The critical unsettled economic question in this connection pertains to the changes over time in the substitution possibilities among natural resources, labor, and reproducible capital.

In dealing with this question, a specific theory of these substitution possibilities for each of the following classes of activities would be of some help: direct substitution of capital



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**“...economic theory is yet  
incapable of predicting the sup-  
ply of additional, new man-made  
substitutes for natural  
resources.”**

and labor for natural resources in the production of natural resource commodities and in providing amenity services; substitution of capital and labor for natural resource commodities in industrial production; likewise in household production; and natural resource-saving adjustments in what is finally consumed. But to reckon fully with these various substitution possibilities, we would also have to know the changes that occur over time in the technical possibilities to substitute.

In retrospect, a wide array of man-made substitutes for natural resources have been developed; namely, substitutes for land in agricultural production, for natural resource commodities in industrial and household production, and in what is finally consumed. These man-made substitutes of the past can be identified and their supply effects can be determined, but it is fair to say that economic theory is yet incapable of predicting the supply of additional, new man-made substitutes for natural resources. The lack of such a theory does not mean we are wholly ignorant with regard to future prospects in this regard.

Before considering the course of agricultural land rentals as one of the prices of the services of natural resources, the state of our knowledge about substitution within other classes of economic activities calls for a brief comment. What is known about substitution among capital, labor, and natural resource commodities in U.S. manufacturing is presented succinctly by Humphrey and Moroney.<sup>10</sup> The two main sets of conflicting views are reviewed followed by an appeal to new evidence using two alternative research designs in estimating substitution as it is revealed in manufacturing during 1963. They conclude that regardless of the underlying causes of input substitution, be it technology-induced or price-induced, “....the evidence suggests that labor and, to a less degree, capital are substitutable for natural resource products among most of the resource-using product groups of American manufacturing.”

There is no comparable study of substitution in household production, in part, no doubt, because the extension of theory to deal with household production and using it in undertaking empirical analysis are very recent advances in economics. There are some useful studies of substitution that occur in the choice of the components that enter final consumption, including the

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consumption of natural resource amenities.

Our portrait of prices is pleasing to behold; more pay for less work and enough more of nature's commodities at about the same real price in 1970 as in 1900, although the population had grown from 76 to 203 million and GNP had increased nearly ninefold. But is it a true picture? Our deflator is obviously influenced by the rising cost of labor. It may not be the appropriate deflator in the case of natural resource commodity prices. Beyond this, there is an important defect in our treatment of the price effects of natural resources. It arises out of the fact that natural resource rents were a declining part of actual commodity prices. Accordingly, the course of commodity prices which we have presented is biased upward because of the increasing share of the real costs of producing commodities consisting of wages and of reproducible capital costs. Although the output per man-hour of the extractive industries has increased, we find that, in general, the more labor-intensive the commodity the larger is this upward bias. Within agriculture, for example, the deflated price of wheat declined by one-half between 1900 and 1970-72, whereas that of fresh tomatoes doubled between 1920 (the first date for which the price is available) and 1972. I wish we could determine the true price of the services of natural resources.

If we knew the true rent paid for the original properties of farmland, we would have the most important price of the services of natural resources, inasmuch as the value of the output of agriculture dominates the total value of the output of all extractive industries.<sup>11</sup> But the rent we want is very elusive, for here too the rent that is reported is definitely biased upward and increasingly so over time. The farmland rent that is recorded is not Ricardian Rent; only a part of it is rent paid for the original properties of the soil.

A substantial part of the productivity of farmland is man-made by investments in land improvements. There undoubtedly have been circumstances and periods when some disinvestment occurred. In the United States during the thirties, soil depletion, including water and wind erosion, became a much publicized issue. The New Deal provided government subsidies for soil conservation programs. Although the actual soil depletion was much exaggerated, the soil conservation programs

have been, among other things, land-improving public investments.

To acquire a perspective of the extent to which the productivity of farmland is man-made, we turn briefly to other parts of the world on this point. The original soils of western Europe, except for the Po Valley and some parts of England and France, were, in general, very poor in quality. As farmland, these soils are now highly productive. The original soils of Finland were less productive than most of the nearby western parts of the Soviet Union; today, however, those of Finland are far superior. The original farmland of Japan was vastly inferior to that of northern India. Presently, the difference between them is greatly in favor of Japan. Argentina has excellent natural soils for growing corn and it has good wheat land. But its productivity is far below that of Iowa and Kansas, States in which farming began with raw land comparable to that of parts of the Argentine. Harsh, raw land is what most farmers since time immemorial have started with; what matters much over time is the investment made to enhance its productivity.

In the United States, investments made to improve the raw land with which farmers began are of various forms and the accumulated amount is large. These investments, however, did not occur at a steady rate because the incentives to invest fluctuated widely over time. They were large during most of the first two decades of this century, notably so in drainage in what are now the best parts of the Corn Belt. From 1920 to 1929 and even more so in the thirties, investments to improve farmland were at a low ebb. Since then, these investments have gone on apace with the government paying much of the bill. Modern earth-moving equipment reduced sharply the costs of terracing, of improving the water run-off courses, and of leveling land. Since the late thirties, the acreage under irrigation doubled; it now covers 40 million acres and has cost billions of dollars, much of which has been paid by U.S. taxpayers.

In the more arid and extensive farming parts of the Mountain and Pacific States, the cash rent paid for grazing land, which includes the good higher altitude pasture, averaged less than \$4.00 per acre in 1970. The market value of farmland per acre in California provides a clue to the implied effects of

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investments on rents. In 1970, nonirrigated cropland sold on the average for \$560 per acre compared to \$1,090 for irrigated land used for intensive field crops. Irrigated land used for truck and vegetable crops was priced at \$1,670 per acre and irrigated orchards and groves with their investment in fruit-bearing trees were priced at \$2,730 per acre.<sup>12</sup>

Lindert's study of land scarcity<sup>13</sup> includes a series of farmland rents extending back to 1900. It is the gross rent per acre of land rented for cash, restricted to five Midwest States. The actual gross rent is adjusted by consumer prices. These rents rose nearly 15 percent from 1900 to 1915, declined 30 percent by 1920, and drifted even lower as of 1940. Lindert's series then shows an upward trend beginning in 1950. By 1970, these rents were 6 percent above 1900 but less than in 1915.

Although farmland prices and agricultural commodity prices fluctuate more over time than gross cash rents, the patterns are in general quite similar. But none of these patterns provides any direct evidence on the share of the gross cash rent that is to be attributed to the original properties of the soil. The indirect evidence indicates that the expenditures of landowners, including the value of time they devote to the management of this property, has risen substantially from 1900 to 1970. It also indicates that land improvement investments and investment in buildings and in other structures, especially so in a livestock area such as the Midwest, have been large over the period since 1900. My interpretation of this indirect evidence is that the share of gross cash rent attributable to the Ricardian Rent component declined between 1900 and 1970, probably as much as a third for the reasons indicated. If this interpretation proves to be valid, it implies that whereas gross adjusted cash rents were about the same in 1900 and in 1970, the value productivity contributed by the natural land resource declined substantially. Major factors accounting for this decline have been the effects on farmland rents of the development and use of man-made substitutes for farmland.

We have sketched the seven decades to show the marked upward trend in the economic value of human time. In marked contrast, as we have shown, the price of materials most dependent on natural resources during these seven decades has not tended upwards. It is also noteworthy, although we are not presenting

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**"The human agent becomes ever more a capitalist by virtue of his personal human capital..."**

the data, that real wages rose somewhat between 1860 and 1900. The increase was small, rising between one-half and onefold for the several countries, including the United States, listed in table 2. Going back in history a bit further, back to Ricardo's day, real wages were rising, but here the comparison has to be in terms of the cost of food. A clue is to be had in the change in the price of wheat relative to that of wages. The estimates that follow tell a good deal about economic history using wheat and wages.

**2 weeks of wages  
in bushels of wheat**

Time of Ricardo (1817) England	1
Marshall's time (1890) United States	20
Eighty years later (1970) United States	200
State of being very poor (1975)	
India plowman	3.5
India field laborer	2 or less
	(Ricardian shadow)

### **High Price of Human Time Implications**

The social, political, and economic implications are pervasive. The high price of human time is a clue to many puzzles. These puzzles include the shift in institutional support from the rights of property to that of human rights, the decline in fertility, the increasing dependence of economic growth on value added by labor relative to that added by materials, the increases in labor's share of national income, the decline in hours worked, and the high rate at which human capital increases. The human agent becomes ever more a capitalist by virtue of his personal human capital, and he seeks political support to protect the value of that capital. These are some of the major implications of the high price of human time. I shall comment on a few of them.

#### **Institutions**

The rise in the value of human time makes new demands on institutions. Some political and legal institutions are especially

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subject to these demands. What we observe is that these institutions respond in many ways to the changes in demands of the economy. The legal rights of labor are enlarged and in doing so some of the private rights of property are curtailed. The legal rights of tenants are also enhanced. Seniority and safety at work receive increasing protection and discrimination in employment is curtailed. Since I have dealt with these institutional issues and with ways of bringing the analytical tools of economics to bear on them elsewhere,<sup>14</sup> I shall not pursue these issues further on this occasion.

### Labor's Income Share

The interactions between the effective labor force at work and hourly wages on the one hand, and the amount of nonhuman capital and the price of the services of that capital on the other, are exceedingly complex. Kuznets<sup>15</sup> gives us an analysis of these interactions in which he takes account of the increases in the stock of wealth represented by land and of the stock of reproducible producer capital and the changes in the prices of the services of these forms of capital, along with the increases in man-hours worked and the rise in the price per man-hour worked. His analysis implies an increase in labor's income share.

The obverse of the increase in labor's share of national income is the decline in the share accruing to property assets. Appealing once again to the studies of Kuznets,<sup>16</sup> where he takes a fairly long view of the development in western countries, he finds that the share of national income accruing to property assets declined from about 45 to 25 percent, while labor's share rose from about 55 to 75 percent.

By 1970, about three-fourths of the official U.S. national income consisted of employee compensation.<sup>17</sup> The remaining fourth is classified as proprietors' income, rental income, net interest, and corporate profits. These four classes of "property" income include considerable amounts of earnings<sup>18</sup> that accrue to human agents for the productive time they devote to self-employed work and to the management of their property assets. A conservative estimate of the aggregate earnings that accrue to human agents, as employee compensation plus self-employment earnings, and for management of assets within the domain of the market sector, accounts for more than four-fifths of the 1970 U.S.



national income.

Measured national income, however, is substantially less than the full income that people acquire from the services of their property and for their time inasmuch as the concept of national income is restricted to the economic activities of the market sector. It excludes the economic value of all household production. The additional income that is realized from household production is in large part contributed by the value of the time of housewives. Also omitted are the earnings that adult students forego in investing in their education, and the wages that members of the labor force forego in acquiring on-the-job training. These and still other income-producing activities are not included in the accounting of national income.

It is clear historically that labor's income share increased as the price of time rose. The development of the U.S. economy from 1900 to 1970 strongly supports this implication. During 1900-1909, using the official concept of national income, employee compensation accounted for about 55 percent of national income compared to 75 percent in 1970.<sup>19</sup> Between 1900-1909 and 1970, the changes in the shares of income other than employee compensation were: proprietors' income declined from about 24 to 8 percent, rental income from 9 to 3 percent, and net interest from 5.5 to 4.1 percent of national income, whereas corporate profits rose from 7 to 9 percent. The latter two income components fluctuated widely over this period as would be expected in view of the uneven performance of the economy over time.

### **Farmland Rent**

The reason why Ricardian Rent has lost its economic sting is implied by the increases in labor's income share, in the declines in the income share accruing to property assets, and in the marked decline in the income share attributed to rental income, which fell from 9 to 3 percent between 1900-1909 and 1970. Farmland rent that is attributed to the original properties of the soil has become an exceedingly small part of U.S. national income. As a consequence, the social and political influence of farm landlords has become minute.

### **Time Allocated to Work**

Price and income effects of hourly earnings explain a wide

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array of changes in the allocation of time. When expected future earnings from more education rise, the response of youth is to postpone entering upon work for pay in order to devote more years to education. The advantages of youth in acquiring the additional education is of two parts, namely the wages that youth forego are lower than they are at older ages and there are more years ahead for youth to cash in on the expected higher earnings from the additional education.

As wages increase people who earn their income by working can afford to retire at an earlier age because of the larger retirement income that they are able to accumulate during their prime working years. A counter-effect of increases in earnings is in the improvement in health that is purchased which extends the years that individuals may opt for work. The rise in the value of time of women is an incentive to substitute various forms of physical capital for their time in household production, and inasmuch as children are for women labor intensive, the demand for children is reduced, and an increasing part of the time of women is allocated to the market for labor.

The increases in earnings also explain the decline in hours of work or the increase in "leisure" during this century. For the U.S. civilian economy, the average weekly hours declined from about 53 to 37 hours over the period from 1900 to 1970, and the average annual hours per employee decreased from 2,766 to 1,929 hours. The interaction between annual hours allocated to work and earnings shows a decline of 7 percent in hours and a 43-percent increase in annual earnings between 1900 and 1920, for the 1920 to 1940 period these changes were 12 percent and 53 percent respectively, and for 1940 to 1970 there occurred a 13-percent decline in annual hours while real annual earnings increased by 73 percent.

**Toward a Population Equilibrium**

One of the important implications of the high price of human time is its effects on fertility. The argument is that the high price of time in high-income countries accounts in large measure for the observed decline in fertility. Most of these countries have arrived at birth rates that are at or below replacement rates. The argument setting forth the economics of the process that leads



toward a population equilibrium is presented in two papers, one by Nerlove and the other by me.<sup>20</sup>



I began with the question: what have our ideas and institutions contributed to the high value we place on human beings and to the remarkable increases in the value of human time? I have set the stage with a historical view to help us in examining critically our social, political, and economic ideas embodied in our institutions, as we ponder this important question.

### References and Notes

<sup>1</sup> It will be necessary to distinguish between the concept of human capital when it is restricted to the abilities that people acquire at some costs and the concept of human capital that includes all innate and acquired abilities of human agents. It is the latter concept that is relevant at this point.

<sup>2</sup> See: Theodore W. Schultz, "The Value of the Ability to Deal with Disequilibria," *J. Econ. Lit.* 13, Sept. 1975.

<sup>3</sup> These are updated estimates of Albert Rees of the total compensation per hour at work of manufacturing production workers in 1967 dollars. More will be said about these estimates presently.

<sup>4</sup> The upward trend of real hourly wages, as measured by Rees, rises weakly from 1900 to the middle of the next decade; it then rises sharply during World War I, after which it rises weakly through the twenties and early thirties. There then follows a strong upward trend for two and a half decades, after which it rises weakly once again from the late fifties to 1970. The years which show a decline are 1904, 1907, and 1908, and then 1914, 1919, 1921, 1922, 1925, 1932, 1945, and 1946.

<sup>5</sup> N. Potter and F. T. Christy Jr., *Trends in Natural Resource Commodities*. Baltimore: Johns Hopkins Univ. Press for Resources for the Future, 1962.

<sup>6</sup> Professor Robert S. Manthey, Michigan State University, has been most generous in making offsets of his numerous tables available to me. I am much indebted to him.

<sup>7</sup> No doubt the reader, who is strongly of the belief that the 1973-75 upsurge in prices of the services most dependent on natural resources is the beginning of a new era, will be inclined to look upon the indexes of prices in these tables as bygones that are no longer meaningful for the future. The argument against this view is that the events, both natural and man-made, that accounted for this upsurge in these prices are in large part transitory events. The economic processes that account for the observed prices, say from 1960 to 1972, are approximately the more permanent relative prices that are in general likely to prevail once again instead of the very high transitory prices of 1973-75.

<sup>8</sup> David B. Humphrey and J. R. Moroney, "Substitution Among Capital, Labor, and Natural Resource Products in American Manufacturing," *J. Political Economy*, 83, 1975, 57-82.

<sup>9</sup> John V. Krutilla and Anthony C. Fisher, *The Economics of Natural Environments*. Baltimore: Johns Hopkins Univ. Press for Resources for the Future, 1975.

<sup>10</sup> Humphrey and Moroney, *op. cit.*

<sup>11</sup> Agriculture accounted for 72 percent of the total output of the extractive industries in 1900 and for 61 percent in 1970.

<sup>12</sup> U.S. Department of Agriculture, Economic Research Service, *Farm Real Estate Market Developments*. July 1972, table 8.

<sup>13</sup> Peter H. Lindert, "Land Scarcity and American Growth," *J. Econ. History*, 34, 1974, pp. 851-84, app. table 1. States included in this series are: Iowa, Illinois, Ohio, Wisconsin, and Minnesota.

<sup>14</sup> See: Theodore W. Schultz, "Institutions and the Rising Economic Value of Man," *Am. J. Agr. Econ.* 50, Dec. 1968. See also the useful paper by Vernon W. Ruttan, *Integrated Rural Development Programs: A Skeptical Perspective*. Agricultural Development Council, New York, 1975, reprinted from *International Development Review*, 17, 1975.

<sup>15</sup> Simon Kuznets, *Modern Economic Growth*. New Haven: Yale Univ. Press, 1966. Chapter 4, pp. 181-183, bears directly on this analytical issue. This part of the analysis is restricted to the United States and to the period from 1909-14 to 1955-57.

<sup>16</sup> Simon Kuznets' studies of economic growth and the distribution of income are classic contributions to this subject. See: (1) "Economic Growth and Income Inequality," *Am. Econ. Rev.* 45: 1-28, March 1955; (2) "Quantitative Aspects of the Economic Growth of Nations: VIII Distribution of Income by Size," *Econ. Development & Cultural Change*, 11 (II): 1-80, Jan. 1963; (3) *Modern Economic Growth*. New Haven: Yale Univ. Press, 1966; and, (4) *Economic Growth and Nations*. Cambridge: Harvard Univ. Press, 1971.

<sup>17</sup> U.S. Bureau of Economic Analysis, *Long Term Economic Growth, 1860-1970*. Washington, D.C.: 1973, p. 22. Compensation of employees includes income accruing to persons in an employee status such as wages and salaries, tips, bonuses, commissions, vacation pay, and payments in kind. Also included are supplements and fringe benefits such as employer contributions to private pension, health, and welfare funds.

<sup>18</sup> We shall restrict the concept of *earnings* to the income that accrues to human agents as compensation for their productive services. The income accruing to the owners of property assets for the productive services of their property will be referred to as *property income*.

<sup>19</sup> U.S. Bureau of Economic Analysis, *op. cit.*

<sup>20</sup> In *Economics of the Family: Marriage, Children, and Human Capital*. Chicago: Univ. of Chicago Press, 1975, edited by Theodore W. Schultz. See Marc Nerlov, "Toward a New Theory of Population and Economic Growth," pp. 527-545. Also: Schultz, "Fertility and Economic Values," part II, pp. 14-20, deals specifically with "the high value of human time: population equilibrium."

# Policies for Equitable Growth In Developing Countries

Irma Adelman

Lecture 2  
May 17, 1976

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This special adaptation of Dr. Adelman's Bicentennial Year Lecture was prepared by Roberta van Haften and originally published in the October 1976 issue of *Agricultural Economics Research* (Vol. 28, No. 4).

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After two decades of attempts at raising per capita GNP in developing countries, the development community has recently shifted its focus to the challenge of increasing the equity of income distribution. This shift in emphasis was needed. Empirical studies showed that benefits from economic growth did not trickle down. More serious, economic growth has sometimes resulted in a systematic worsening (both relative and absolute) in the position of persons receiving the least amount of income.

The accompanying table tests major growth and equity hypotheses generated by each of three recent studies:

1. A cross-sectional, statistical analysis (A-M in the table) of the sources of differences among countries in the relative amount of income received by the poorest 60 percent of households.<sup>1</sup>

2. An historical analysis (Hist in the table) of processes and

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initial conditions leading to extreme poverty in 24 countries in the middle of the 19th century.<sup>2</sup>

3. A model (A-R in the table) of the South Korean economy developed and used to explore the effects<sup>3</sup> of various major (but nonrevolutionary) strategies, policies, and programs on poverty.

In the following table, the interaction with income distribution of each variable or influence is described; the studies on which the description is based are noted; and the reasons for the impact on income distribution are summarized.

All three studies differ completely in methodology and in the settings in which the relationships between poverty and growth are investigated. Yet, all three lead to the following remarkably consistent and reinforcing set of policy conclusions:



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## Hypotheses concerning the impact of economic processes on income distribution

Variable or influence	Impact and supporting studies	Reasons for Impact
Per capita GNP and level of socioeconomic development	For poorest 60 percent of population, their relative share shows U-shaped relationship to per capita GNP (A-M). Relationship between absolute per capita income and income distribution complex; very large differences in development levels positively related to both average income and reduction in poverty; but rapid growth tends to increase poverty even when average income rises (Hist and A-M).	At very low levels of development, a small number of growth points leads to concentration of benefits of economic change in hands of oligarchy of merchants, industrialists, and plantation owners; indirect effects of economic change tend to hurt the very poor by displacing and marginalizing their activities. Only beyond a threshold determined by extent and spread of expansion of economic opportunities is the trickle-down effect sufficient to raise average incomes of urban wage earners and agricultural laborers; even then, extreme poverty is reduced very slowly because the labor market is segmented; human skills lack adaptability.
Short-term rate of growth of per capita GNP	No simple association with income distribution; structure and composition of the increase in income, not average degree in income change, determines impact (A-M and A-R).	Nature, extent, and rapidity of structural change govern the direction and magnitude of the net balance of the processes of displacement, absorption, and social adaptation.
Economic innovations	At low and medium-sized levels of development, net impact of structural change of any kind on the poor is systematically unfavorable, even when average incomes rise.	The poor do not have resources and skills to take advantage of expanding economic opportunities; the operation of product and factor markets tends to marginalize their earnings or displace their skills. Once skills have been permanently marginalized or products displaced, the poor lack human and financial capital for adaptation.

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- Socioeconomic dualism
- Sharply dualistic growth favors the rich and harms the relative and absolute position of the poor more than do lesser degrees of dualism (whether at very low or higher levels of development).
- Natural resources
- A favorable ratio of agricultural land to population, with family-size holdings prevalent, restricts extreme poverty; abundant natural resources are associated with extreme concentration of income (A-M and Hist).
- Rate of population growth
- Past patterns of population growth are an important determinant of resource-population ratios and thus a key initial condition determining extent of extreme poverty (Hist and A-M). In the medium run, population growth affects significantly the net balance of displacement and absorption processes (Hist and A-R). In the short run, population growth is insignificant to income distribution (A-R and A-M).
- Rural-urban migration
- Rural-urban migration reduces rural poverty and increases urban poverty; up to a point, it reduces overall poverty (Hist and A-R).
- Concentration of growth in limited sectors or regions, in the presence of segmented labor markets characteristic of underdeveloped countries, aggravates displacement and marginalization of skills, thus contributing to pools of surplus labor.
- Availability of reserve of unappropriated agricultural land restricts numbers of extremely poor; presence of abundant natural resources fosters exploitation and appropriation of the benefits by small elites, foreign and indigenous.
- Extremely long lag (50 years or more) occurs before changes in rate of population growth affect extent of extreme poverty significantly; medium-run effects depend on interaction of population and migration given the availability of resources.
- Rural-urban migration in labor market reduces urban wages or increases urban unemployment, while decreasing rural underemployment or increasing wages of agricultural labor; in commodity markets, such migration shifts the terms of trade in favor of agriculture, thus favoring the more numerous and poorer rural low-income groups; extremely rapid migration leads unfavorable impact on the urban poor to dominate favorable rural effects.

## Education

Widespread education and literacy are associated with larger share of income of middle quintile; no systematic association occurs with other features of income distribution (A-M and A-R).

Widespread education spreads ownership of human capital, distribution of wage income, and increases rural-urban migration; thereby shifting population to higher income areas and improving agricultural terms of trade.

## Land tenure and holdings

Impact of change on the poor critically depends on distribution of landownership; prevalence of subsistence farming where land is abundant favors distribution of income; parcelization of land or marked concentration of ownership with cultivation by either landless laborers or subsistence tenants contributes directly to poverty; widespread owner-operation of commercial farms favors distribution of income, although it may not help the very poor (A-M and Hist).

Concentrated ownership where cultivators face lack of alternative employment permits high rate of appropriation of surplus product; opening up of new opportunities in presence of unequal abilities to respond widens inequality; processes conducive to dispossession of land or marginalization of economic activities tend to be irreversible.

## Modernization of agricultural techniques

Increases in agricultural productivity tend to worsen the position of the rural poor, while benefiting better off farmers and the urban poor (A-R and Hist). No significant cross-sectional relationship exists.

Access to complementary resources (held only by better off farmers) is necessary for adoption of improvements; increases in output worsen terms of trade, harming rural poor and benefiting urban poor; no cross-sectional relationship exists due to interdependence between impacts of agricultural technology and land tenure.

## Size of subsistence agriculture sector

Total absence of commercialization of agriculture favors distribution of income (Hist). Among countries with some commercialization, no systematic relationship exists between commercialization and distribution of income (Hist and A-M).

Impact on income distribution of commercialization of agriculture depends on land tenure and concentration of ownership. It also depends on the course of terms of trade; short-term and medium- or long-run impacts may diverge, depending on demand and supply elasticities.

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Trade and industrialization strategy	More diversified labor-intensive exports are associated with a larger share of income to both the poor and the middle classes (A-M and A-R).	Agricultural terms of trade improve and rural-urban migration is more easily absorbed.
Level and change in industrialization	U-shaped relationship is evident in cross-sectional and historical studies. Major differences in level of industrialization are negatively associated with extent of poverty, but among more industrialized countries, poverty is greater in those at higher levels which industrialized most rapidly (A-M and Hist).	The relationship is complicated: interdependence exists between level and rate and threshold effect.
Market socialism	Share of income of top 5 percent is reduced; share of 15 percent is increased (A-M and A-R). Overall growth rate and overall mean incomes are reduced but relative and absolute incomes of lowest 70 percent are higher in the medium run (A-R).	Profits and interest accruing to top 5 percent are reduced; technocrat and bureaucrat incomes are increased. Given nationalized firms which are less dynamic, absolute gains to the poor evident in the medium run are eventually eroded, but distributional gains increase.
Effectiveness of and improvements in financial institutions	No systematic association with income shares of the poor exists even though the effects are important for growth (A-M and A-R).	Spread of financial institutions even in rural areas tends to benefit primarily those who are better off. Improved access to credit for poor farmers is only beneficial when combined with improved access to technology and knowledge. Increases in investment, even in small-scale industry, tend to work through their impact on economic growth (relationship of latter to income distribution is complex).
Effectiveness of and improvements in tax systems	No systematic association with distribution in cross-sectional study exists (A-M). Little impact emerges in the model (A-R).	Structure of tax system influences who is poor and who is rich rather than how many; tax base is sufficiently low so that there is little scope for impact.



1. Intervention to improve the distribution of income is extremely difficult. The Korean policy model experiments emphasized both the stability of the size distribution of income despite policy interventions and also the ephemeral nature and inefficiency of most single-pronged antipoverty programs. The cross-sectional study indicated how few potentially effective policy instruments existed and what difficulties their very makeup posed for persons intent on purposive change.

2. Within a given set of structural conditions, it is strategy and process which determine the impacts of economic change on the poor. The historical study indicated, for example, that countries sharing a particular mix of poverty also shared a set of historical processes of change. The Korean policy model experiments showed that as long as policy interventions were tacked onto a given strategy which remained unchanged, the distribution of income tended to revert to the pattern it would have had in the absence of interventions.

3. Successful antipoverty policy does not merely entail choosing the right development strategy. In the cross-sectional study, for example, some policy variables proved important only when countries had achieved minimal levels of education and spread of economic modernization. The historical study also showed that the impact of economic change on the poor depends critically on the type of social structure and social responses to economic change—such as social constraints on population growth, the response of fertility and migration rates to changing economic opportunities, legal and customary barriers to the subdivision of land, arrangements for land tenure and holding, and the strength of extended family protection of the unemployed and underemployed.

4. Unbalanced growth strategies are bad for the poor. Historically, the concentration of growth in a few sectors or regions has had backwash effects that have accentuated the overall displacements of economic activities arising from commercialization and industrialization.

5. A systems or general equilibrium approach is required to design a strategy which predictably improves the position of the poor in the medium term. Both the historical and South Korean modeling studies emphasize the importance of indirect effects and dynamic interactions. Not infrequently, the indirect effects of an

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## Irma Adelman

initial impact of change swamp the direct effects and even reverse their direction.

Taken together, results of the three studies underline the great difficulty which planners face in finding policy instruments that effectively bring about more equitable paths of economic growth.

### References and Notes

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# The Fear of Knowledge

Charles E. Bishop

Lecture 3  
June 15, 1976

The U.S. Department of Agriculture is one of the Nation's oldest and foremost agencies in the generation and dissemination of knowledge. Its Economic Research Service was a pioneer in the application of economics to the problems of rural people. It seems appropriate, therefore, that I should focus my attention in this bicentennial lecture on the changing emphasis placed upon education in our society with particular reference to the acceptance of intellectuals in society, and the changing relationships between our institutions of higher education and our government.

Intellectuals have generally been held in relatively high esteem in our country, and we have placed heavy emphasis upon providing opportunities for higher education for the public. The extent of this support, however, has varied sharply over the past 200 years.

Some of the greatest minds of 18th century America—including Jefferson, Hamilton, and Madison—once collaborated in preparing a speech for George Washington that was never delivered, but which was carried in various newspapers in 1796. In this address were the following sentences: "Promote then as an object of primary importance institutions for the general

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diffusion of knowledge. In proportion as the structure of a government gives force to public opinion, it is essential that public opinion be enlightened."

Think of the significance of those words as we observe the bicentennial of our country. They were the words of a group of brilliant intellectuals intent upon founding a major new nation. And two centuries later, the "institutions for the general diffusion of knowledge" whose establishment these men demanded have created a knowledge-based and knowledge-oriented society without precedence in the annals of history.

It is therefore with considerable irony that we note that a society founded and nurtured by intellectuals, a society which has benefited so greatly from a spectacular development and utilization of knowledge, also is a society in which a spirit of anti-intellectualism has periodically slowed economic and social development. In the recent past, anti-intellectualism has gained renewed strength in our country, and I believe that this has particularly foreboding portents for a society so heavily knowledge-based. I am concerned that this new surge of anti-intellectualism is based not only upon skepticism of intellectuals but a growing fear of their product: knowledge. I wish to address myself to that fear on this occasion: to examine why and how it has arisen, and to suggest some ways in which we should combat the nihilistic tendencies it creates.

The early leaders of our country were remarkably wise in the emphasis they placed on education and social enlightenment. Their concepts and their public pronouncements exemplified a spirit of American intellectualism in which freedom of thought and inquiry contrasted sharply with the Puritan dogmatism of an earlier era. Moreover, they were able to reconcile this wide-ranging intellectualism with a practical approach to political activity. The result was a blending of intellectual idealism and political pragmatism which guaranteed a progressive form of government for the fledgling republic. The founding fathers demonstrated that men of learning were valuable to good government, so valuable, in fact, that the fashioning of the bold new experiment of the American democracy could be entrusted to them and to no others. The fear, in that day, was of a lack of knowledge, not of its acquisition and its practical use.

The initial golden years of intellectualism in American govern-

ment lasted until the Jacksonian era when anti-intellectualism made its first serious appearance. While much was accomplished under the Jackson presidency, and while his capable leadership gave rise to a new and broader emphasis on democracy in our country, the concepts of quality and equality were often blurred in the government he headed. Intellectual development in Jacksonian America became resented as a boorish kind of excellence, as an unjustified claim to distinction, as a challenge to egalitarianism, and as a quality that somehow deprived a man or woman of what was known as the "common touch." As stated by Richard Hofstadter, there was, in the Jackson administration, "an estrangement of training and intellect from the power to decide and manage."<sup>1</sup>

In the years between the Jackson and Lincoln administrations, there was a general intellectual reawakening, a quickening of the spirit in the pursuit of knowledge. Part of this was attributed to industrial and agricultural expansion, and the call for new knowledge to enhance this expansion. But there also was a spirit of



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intellectual liberality exemplified by such men as Emerson, Longfellow, and Hawthorne. It was Hawthorne who identified and promoted the intellectual flowering of his day with his statement, "Nature's highest purpose for man is that of conscious intellectual life and sensibility." And it was Emerson who said: "What is a weed? A plant whose virtues have not yet been discovered."

These were the years also when the vast lyceum movement provided a stimulus to intellectual curiosity, and when the country's leadership suggested the possibility of a nationwide, publicly supported system of higher education. It was from this movement that the land-grant system emerged. Credit for the establishment of the land-grant system rightfully belongs to Justin Morrill and his colleagues in the Congress. But somehow it seems particularly appropriate that the Land-Grant Act was passed during the administration of a president who, like none before or after him, exemplified the concept that intellectual development was democratic and egalitarian, and that it should be the universal aspiration of all men and women, regardless of their stations in life. The image of Lincoln, reading his books by candlelight, will forever portray the intellectuality that springs from the uncommon motivation of the common man. And the land-grant movement provided the universally available opportunity for education that Lincoln envisioned for all his countrymen.

From Lincoln's time until after the turn of the century, our country underwent a great economic and industrial expansion and transformation. During the latter part of this period, especially, politics and government were oriented toward the acquisition of wealth and power. During this period there also was a substantial reorientation and growth in our educational institutions. Indeed, the first thrust toward reform in scandal-ridden government in the late 1800's began in the halls of ivy on the college campuses, just as it did in the late 1960's.

One of the students at Harvard eventually became the second great intellectual leader in the Republican Party. Early in life, he developed a crusading spirit of reformation. Today, he is recognized more for his exploits of physical leadership than for his intellectual achievements. It is, therefore, sometimes forgotten that Theodore Roosevelt was an intellectual who recognized that, in his time, only a leader who appealed to the people on the basis of his physical characteristics could be successful in bringing an

intellectual and rational approach into government. Indeed, there was a general feeling in Roosevelt's day that intellectuals should remain aloof from government, that the brighter minds in the country tended to become fuzzy the moment they became involved with the problems of government. However, Roosevelt was exceedingly well-read and well-informed. And, as he rose in political stature, he initiated reforms that strengthened the Nation's economic development by changing its orientation toward the common good, rather than toward the benefit of the privileged few.

Ironically, the first modern-day Democratic intellectual in the presidency—Woodrow Wilson—held a deep distrust toward other intellectuals. This distrust probably came from the fact that he was a university president for 8 years, and commitments of that office prevented him from maintaining his own intellectual proficiency.

Following Wilson's administration, the country went through the intellectual drought of the twenties and thirties. The Ku Klux Klan gained strength. The Scopes Trial comprised an all-out attack on intellectualism. And, the depression years discouraged the development of higher education.

Then came the administration of Franklin Delano Roosevelt, and the country for the first time since the days of Jefferson and Hamilton saw a major influx of intellectuals into government. While some antipathy was displayed toward such members of his "brain trust" as Rexford Tugwell and Raymond Moley, FDR nevertheless created an unprecedented harmony between the popular cause in politics and the dominant mood of the intellectuals. The Ivy League schools provided much of the reservoir of talent that went to Washington. Many of these bright young men were the Harvard proteges of Felix Frankfurter. They aroused much antagonism among the traditional political pros of the country, but they brought the fresh winds of innovation into governmental, economic, and social processes. Unquestionably, they changed the shape and direction of government, and the country itself was changed as it had never been before.

The pendulum then swung full cycle, and in the early part of the fifties the country was subjected to the "great inquisition" of McCarthy. It probably was the most intense surge of anti-intellectualism since the Jacksonian era, and it represented a particu-



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larly disturbing and damaging right-wing syndrome. Intellectuals were automatically equated with a supposed communist conspiracy. Any intellectual in government was subjected to the most frustrating kind of suspicion. Even a dedicated stalwart like Dean Acheson, who was strongly supported by such patriotic champions as Harry Truman and George Marshall, became suspect in the minds of many simply because he was classified as an intellectual.

The aftermath of the McCarthy era was so great that there can be little doubt of its tragic effects on Adlai Stevenson, certainly one of the great intellectuals in American political history. Most of the great minds of the country flocked to the Stevenson banner during his two unsuccessful campaigns for the presidency against an immensely popular wartime leader. During the heat of the campaign it is reported that an aide seeking to encourage Stevenson said to him, "There is no cause for concern. You have the support of all thinking Americans." Stevenson quipped, "That is not enough. I need a majority." Stevenson's intellectual capacity for leadership was unexcelled, but he was in the right place at the wrong time and the Nation will never know the impact his leadership could have had on its future.

The G.I. Bill had a major impact upon higher education following World War II, making opportunities for higher education a reality for millions of young men and women. But the educational system in America did not progress as rapidly as it did in some other countries. We became painfully aware of our complacency about education when the implications of the launching of Sputnik became obvious. Immediately, President Eisenhower moved to strengthen our educational system.

When John F. Kennedy entered the White House, intellectuals hailed the beginning of an "American Renaissance." Not only was Kennedy an intellectual, but he was an aggressive and decisive leader, giving strength and purpose to his intellectual ideals. During the Kennedy administration, academicians who by nature had been rather skeptical of politicians, and vice versa, eagerly responded to the beckoning of a strong government committed to bold new ideas. The stream of academics to Washington during this period was so great that they soon turned from a feeling of being unwanted and unused to the opposite extreme of feeling indispensable.



Highly significant was the Kennedy administration's conscious decision to expand the Nation's educational programs and to commit vast new funding to scientific and technological research. As confidence in science rose, the Nation sought to attain such diverse objectives as conquering space, increasing human longevity, removing discrimination toward minorities, developing the underdeveloped nations, feeding the hungry, and abolishing disease and poverty.

Faced with the commitment to solve complex problems and the necessity of having access to the best available knowledge, the government turned increasingly to the universities and to members of their faculties for advice. Among academicians there was a growing feeling that knowledge was useful, that new knowledge was needed, that the search for it would be supported, and that in the process of generating it and making it accessible to the public, the academician would gain enhanced stature in the society.

Yet, it is a characteristic of the American people that we are impatient. As a society we are prone to leap into something with tremendous gusto and great expectations without considering important consequences. There is no doubt that during the 1960's the public became overly imbued with research and education. Expectations were developed that could not be fulfilled. Many of the goals pursued by the Nation proved to be very elusive. As the public recognized that the problems of society were acute, but much more difficult to resolve than anticipated, enchantment with research diminished and investment in research was increasingly questioned.

While the results of research formed the guiding assumptions for many ventures by government, the ties between the ideas of the scholars and public policy often proved to be very tenuous. All too frequently the research information of the scientists was fragmented, contradictory, and inconclusive. There also was a distinct difference in orientation of the scientist, serving as an adviser, and the orientation of policymakers. The scientist is oriented toward positivistic thinking, and is most effective when dealing with measurable phenomena. He is accustomed to thinking and working within the protective confines of highly controlled conditions. Public policy, on the other hand, is always subject to the vagaries of politics, and normative considerations weigh heavily on the calculus of the politician. The goals adopted

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by the Nation during the early 1960's were so diverse that conflicts between political and academic considerations and the necessity for harsh compromises soon became apparent.

The emerging strain between the academics and the policymakers was magnified by the fact that once the Nation had committed itself to achieving goals that required the generation of additional knowledge through research, a serious mismatch developed between the time required to carry out creative research and the attention span of politicians committed to particular policy objectives. Following the success of the space program and the apparent failure of the poverty and manpower programs, the government sought to achieve a better matching of research products and social needs by placing more emphasis upon "mission-oriented research."

Faced with the complexities of achieving the pre-established goals of social policy and the inadequacies of their research information, the academicians advising government became frustrated and their optimism rapidly dissipated into despair. At the same time, government became more hesitant about seeking the advice of the academician. As the decade of the 1960's drew to a close, the ties between the intellectuals and government had weakened substantially.

During the Nixon administration the welcome mat, once proudly displayed at the White House door for the President's Science Advisory Council, was unceremoniously yanked away and the Council was abolished. This had a devastating effect on the morale of scientists who became painfully aware of the extent of their ostracism and alienation from government and its programs.

Increasingly, questions were asked about the utility of knowledge. The rapidity of the expansion of knowledge in the past three decades prevented adequate adjustment and adaption to the new conditions it spawned. The result has been what we have called a "culture shock," and it has compounded fears toward intellectualism. Today, attacks against new knowledge are coming from the left as well as from the right. The recurring resentment against intellectuals which we have come to expect at various stages in our history has been transformed into something much more disturbing: a very significant fear of the new knowledge they are creating. Part of this fear results from inability to retain the traditional values of another time because of the value changes

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**"...retreating into a technological  
Eden that never existed."**

wrought during the sixties. Part of it stems from the foreboding aspects of misguided technological development and its effects on the environment. And part of it is the terror instilled in all human hearts by the development of nuclear power. As a consequence of these and other factors, the generation of knowledge is falling into disrepute. Intellectuals are no longer ridiculed, as they once were, but for a substantial proportion of the population they are suspected and feared: resented for the changes they have created and feared for the changes they will create in an uncertain future. More knowledge suddenly is equated with the decline in moral standards, the disasters of runaway technology, and the growing complexities of all aspects of human life.

Perhaps even more significant is the growing concern of scientists and academicians over the expansion of knowledge. The awesome possibilities of high-energy research are widely recognized in the academic community. Recently, knowledge in the biological sciences concerning the nature of life and the production of it has progressed so far that an increasing number of scientists and academicians are questioning whether we wish to know more. Underlying this questioning is a growing fear concerning how additional knowledge would be used.

The fear of knowledge, however, is misplaced. Our fear is not of knowledge. It is a fear of how knowledge will be used once it becomes known. Underlying this fear, therefore, is a concern for our own moral weakness and that our knowledge will not be used for the benefit of society.

In the mood of our country today, fear of knowledge finds expression through a wistful desire among large segments of our population to erase some inevitabilities, and to return to the simpler days of a bygone era. Thoughtful people like Lord C. P. Snow point out the impossibility of "retreating into a technological Eden that never existed," but increasingly prevalent reaction is that, while intellectual oracles of Snow's caliber may be right, their messages should be shoved into the apathetic corners of our individual and collective consciousness. Thus, the creators of knowledge who once were the heroes of the American dream are now increasingly being cast as the villains in a nightmare of frightening intellectual development. Pleasurable wonder with the beneficial miracles of scientific creativity is giving way to the creeping dread of "future shock." And the fear snakes its way

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deeply into the heart of our society.

What are the lessons to be gleaned from the changing relationships between intellectuals and the public? First, what our society expects of its universities remains unclear. The utilitarian ideas of Franklin and Jefferson concerning the university's services to the community and to the Nation have not been universally accepted either on university campuses or in government.

There is a general feeling that the interrelated functions of a university, including the generation of knowledge through research, the transmission of knowledge through instruction, and the application of knowledge through public service, should continue to characterize the university. The importance of the university as an idea-generating institution is recognized, but increasing emphasis is being placed upon innovative ways of testing these ideas and making the results available to the community. Although this is an especially important function for a publicly-supported university, there are widely divergent views with respect to how this function should be carried out.

Second, the knowledge base of the university is woefully lacking relative to the complexity of the problems faced by the modern society. Traditionally, our secondary schools, and to a lesser extent our universities, have been cognitively oriented. But in our universities we have been most comfortable when our teaching emphasized basic concepts and when we were communicating to students the scholarly disciplines of the natural sciences, the social sciences, and the humanities. Our academic base has been noticeably detached from the world around us, giving rise to the outcry of students and the public for more relevancy of higher education to the needs of society.

Most professors contend that the greatest service that formal education can render students is to cultivate in them the ability to think critically. Teaching them how to think is regarded as infinitely more important than teaching them what to think about. Formal education, therefore, has leaned heavily upon theory in pedagogical practice. While heavy emphasis upon theory continues to be necessary in teaching how to acquire knowledge, hypothesize about it, assess it, and integrate it into our thinking, it is increasingly apparent that students and the public generally desire a better balance between theoretical and empirical analysis.

In many areas, empirical research is of recent vintage, and the

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**"Social scientists...should get out  
of the business of huckstering  
proposals for new policies."**

findings to date have limited applicability. In some areas, and especially in the social sciences, it is often necessary to conduct research within a highly restricted framework of abstractions. Extrapolation of the findings to the world of the policymaker often results in shattered expectations and disillusionment.

The academic's frustration is exemplified by Moynihan's statement as he left the White House that, "Social science is at its weakest, its worst, when it offers theories of individual and collective behavior which raise the possibility of controlling certain inputs, or bringing about mass behavioral change. No such knowledge now exists. Evidence is fragmented, contradictory and incomplete." He went on to conclude that, "Social scientists should stick to monastic studies of results, emphasizing which programs work and which don't, and they should get out of the business of huckstering proposals for new policies."

Clearly, more comprehensive descriptive and predictive analyses are necessary in refining and improving theory and public policy.

Third, we are at a stage in the development of our society that is of unparalleled significance. While we are becoming more dependent upon new knowledge, we are also becoming more mindful of unanticipated consequences of the generation and use of new knowledge that is developed under highly controlled conditions but applied under general conditions. The consequences of indirect effects of scientific and technological developments are cause for concern to an ever larger spectrum of the population. As a result, there is a growing concern throughout the land that this be a moment when humanism must gain the ascendancy. We are being challenged to guide and direct the geometric progression of knowledge toward civility and humanity, not toward their destruction. Clearly, we need a new humanism, written in a philosophy of history that reflects the course of our past development, but more importantly that will guide our future. In the search for this new humanism, however, we must recognize that there is no respite from the continued development of science and technology. One of our most pressing needs is that intellectuals chart such a humanism for the society.

Fourth, by nature, public policy is controversial. The essence of public policy involves conflict, compromise, and consent. A functionally effective democracy requires an intelligent and

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enlightened citizenry capable of acting wisely in matters of public policy. In an open society the free flow of new knowledge should help to create citizen awareness of issues and citizen participation in democratic processes. Such a flow of information should be pursued resolutely, and the research and education programs of universities must contribute greatly to this process.

But public policy is not determined by science. It is based upon value judgments concerning what is good and bad and how society should be structured and operated, as well as upon belief with respect to fact. These valuations often are deep-seated, conflicting, and powerful, and the hierarchy of valuations differs among individuals. Consequently, given the same data, analyses, and scientific conclusions, individuals and groups may arrive at different decisions with regard to the most desirable policies.

Fifth, we cannot assume automatic support of knowledge generating and disseminating activities. The universities must earn the support, confidence, and public trust vested in them.

There is always the danger that programs of the university may be out of phase with public support and public needs at any point in time. For this reason alone, many pure scientists are concerned that in playing the role of adviser to government on matters of public policy, scientists can endanger public support of science programs. The scientist knows that he must always reserve the right to fail in his scientific investigations. The policymaker, on the other hand, is not likely to be accorded this privilege. It is important, therefore, that the role of the academician serving as policy adviser be clearly differentiated from that of the policymaker.

As was indicated earlier, the current concern over research and technological development derives in part from a growing feeling that important secondary effects often are not given due consideration in policy decisions. There also is a concern that scientists have not been able to provide solutions to major problems that continue to plague us. The low esteem accorded our institutions of higher education also undoubtedly stems in part from the fact that much of the anti-war sentiment of the late 1960's was centered in our colleges and universities.

Whatever the causes, it is clear that over the past 200 years there have been rather pronounced vacillations in public attitudes toward intellectuals and toward higher education generally.



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“...our Nation can ill afford an extended period of estrangement between its scientists and its government.”

In a democracy, such changes in public opinion are not uncommon. And, when anti-intellectualism has become strong or when it has become clear that the Nation was under-valuing education, corrective changes in public opinion occurred. Often, however, the period of adjustment has been quite long. Faced with the multiplicity of complex problems of our time, our Nation can ill afford an extended period of estrangement between its scientists and its government.

Sixth, the academic must link the university to the other institutions in the American society. In the past a great gulf has existed between the academician and those in positions to make public policy. American academicians have been particularly wary of persons in positions of high authority in government. In like manner, those in authority in government have been skeptical of academicians.

Such a distance was accepted and probably was desirable in an earlier era. However, the problems of the complex society in which we live clearly require that the knowledge base be expanded and that access to the best knowledge available be facilitated. If our society is to have this access, the trend toward alienation of the academic community from the policy arena must be halted and reversed. The initiative for this reversal must come from those who are committed to the life of the mind. Only in this way can the stream of knowledge coming from the universities be perpetuated and integrated into the central institutional system of our country.

### References and Notes

- <sup>1</sup> Richard Hofstadter, *Anti-Intellectualism in American Life*. New York: Vintage Books, 1962, p. 171.





# Measuring Economic and Social Performance: New Theory, New Methods, New Data

Karl A. Fox

Lecture 4  
June 22, 1976

To measure the performance of any economic unit, large or small, we need to measure the quantities of its inputs, the quantities of its outputs, and the prices at which they are (respectively) bought and sold. Economic accounts for a nation are based on the same principles as economic accounts for a firm.

To measure the performance of any *social* organization, or a community, or an entire society, it seems to me we need direct counterparts of the quantities, prices, and values that are required to measure *economic* performance. The problems of conceptualizing and measuring these quantities, prices, and values will be the subject of the last—and longest—portion of my lecture.

However, before I settle down to that task, I want to lay the groundwork for it by covering three other topics rather briefly:

(1) The priority and excellence of the quantity, price, and value measures developed for U.S. agriculture and closely related sectors during 1922-53 by the former Bureau of Agricultural Economics (forerunner agency of the Economic Research Service).

(2) The revolution in economic theory and econometrics in the 1930's and 1940's which led to the creation of national income and product accounts.

(3) The current revolution in sociometrics which is bringing sociologists and economists closer together and which may lead to a new synthesis of concepts, methods, and data covering the social system as a whole, including the economy.

### **The Bureau of Agricultural Economics Tradition and Development of the Data Network for U.S. Agriculture 1922-53**

In the 1920's, the Bureau of Agricultural Economics (BAE) took world leadership in the application of multiple regression analysis to the estimation of demand and supply functions for farm and food products, the field in which econometrics achieved its first practical successes. Mordecai Ezekiel and Louis H. Bean of BAE were world famous, and several of their BAE colleagues internationally known, well before the establishment of the Econometric Society in 1930 and the publication of the first volume of *Econometrica* in 1933.

The Agricultural Estimates Division (now the Statistical Reporting Service) was in BAE from (I believe) 1922 to 1953. Charles F. Sarle of that division did some careful analyses of sources and levels of measurement error in agricultural price and production statistics in the 1920's and early 1930's. O. C. Stine (head of BAE's Division of Statistical and Historical Research from 1922 to the mid-1940's) was keenly aware of the limitation of the data, both primary and secondary, from which the great econometricians in and out of BAE were estimating their demand and supply functions. Stine's pressure for more and better data had little glamour in the short run, but Stine had the patience and perspective of an economic historian, which indeed he was. It is no accident that Stine's division was named the Division of Statistical and *Historical* Research.

BAE's economists were more adventurous than those in most other government agencies. Long before the Commerce Department began to publish time series on national income, BAE analysts had developed some proxies for it—industrial workers income and nonagricultural income. In the late 1920's, Norman J. Wall worked on an index of world industrial production to measure shifts in the demand for U.S. cotton and other

export crops. One of Stine's lifelong concerns was to explain changes in the general price level, a problem still with us.

During the 1930's and 1940's, under the leadership of Stine, Frederick V. Waugh, and James P. Cavin and with pressure, no doubt, from H. R. Tolley, O. V. Wells, F. F. Elliott, and others, there were notable developments in BAE's secondary statistics including farm income and expenditures, cash receipts from farm marketings, the food market basket, the index of per capita food consumption, and the supply and distribution tables. Ernest W. Grove was primarily responsible for developing the farm income, expenditure, and cash receipts estimates; Richard O. Been for the food market basket; and Marguerite C. Burke for the index of per capita food consumption and the supply and distribution tables.

I was lucky enough to arrive in the Washington office of BAE in February 1945, when BAE's data system was approaching a peak of completeness, accuracy, and relevance to economic analysis and policy. Wells, Cavin, and Waugh were my mentors and



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supervisors; C. Kyle Randall, Nathan M. Koffsky, Rex F. Daly, Harold F. Breimyer, and Richard J. Foote were my close associates for the next 9 years, which were the happiest years of my professional life. With our commodity and other specialists, our statistical clerks, and our support units, we felt we were the best-balanced economic research and service group in the public service. And I think we really were!

In those days I felt I could work for BAE forever, but I awoke one morning in 1953 and it was gone! I never left BAE. BAE left me.

So, the picture of BAE that stays with me is essentially this: good analysts applying good theory to good data, and making cumulative improvements in measurement and understanding. From the 1920's into the early 1950's (at least), the U.S. food and agricultural sectors were better supplied with economic data and analysis than any other sectors of the U.S. economy and better perhaps than the corresponding sectors of any other economy.

### **The Great Depression and its Consequences for Economic Science: Revolutions in Economic Theory and Econometrics and the Development of National Income Accounts**

Between 1929 and 1932, we in the United States discovered we didn't have the slightest idea how to steer our economy out of the deepest depression in our history.

In 1928, after several years of prosperity under Republican administrations, Herbert Hoover ran for president on the slogan, "two chickens in every pot and two cars in every garage." In 1932, when the national income had shrunk 50 percent in dollar terms and 25 percent of the labor force was unemployed, a hostile parody appeared: "Two chickens in every garage!"

Not only didn't we know how to steer our economy out of a depression, we didn't even know how to measure how deep the depression was.

How bad was the measurement problem? In September 1929, President Hoover appointed a prestigious committee to study and report on "recent social trends" in the United States. The chairman of the committee was Wesley C. Mitchell, President of the

National Bureau of Economic Research and Professor of Economics at Columbia University. Another member, who also served as the committee's research director, was William F. Ogburn, Professor of Sociology at the University of Chicago. A third member was Charles E. Merriam, Professor of Political Science at the University of Chicago. As of 1929, these men were among the most distinguished social scientists in the United States.

The committee's 1,600-page report<sup>1</sup> was printed at the very depth of the Great Depression; it devoted only two or three pages to the national income. Its main exhibit on this subject was a table (p. 229) showing estimates of the U.S. national income annually from 1914 through 1928, and the figures for 1926, 1927, and 1928 were labeled "preliminary." The text beneath the table says that the national income estimates depend on a multiplicity of series, many of which are published several years after the event, but "highly tentative estimates for 1929...show an increase over the preceding year of more than 3 billion dollars." No news yet about 1930, 1931, and 1932!

Apparently, prior to 1930, national income statistics were viewed as having only historical and descriptive interest, and the Republican administrations saw no reason to spend the taxpayers' money trying to measure the taxpayers' national income. In contrast, a great deal of work was done during the 1920's on "economic indicators" by and under the direction of Wesley C. Mitchell at the National Bureau of Economic Research (NBER). Each economic time series—wages, prices, pig iron production, interest rates, and so on—was grist for the mill, and was processed as though it were an independent indicator of something called "the business cycle."<sup>2</sup>

The conceptual framework for processing each time series was denoted by the formula  $A=TS+CR$ , where  $A$  was the actual value of an observation and  $T$ ,  $S$ ,  $C$ ,  $R$  stood respectively for trend, seasonal, cyclical, and random or irregular components. From this, it followed that  $CR=A-TS$ ; the effects of the trend and seasonal factors were to be removed (subtracted) from the original values of the observations in order to isolate, as a residual, the combination of cyclical and irregular fluctuations. The  $CR$  components of the individual series, many hundreds of them, were charted and compared visually with a so-called "reference cycle"

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which was based on an average of the turning-point dates of many of the individual series. Mitchell was a busy man, often tapped for public service, and the final results of his approach<sup>3</sup> were not published until 1946; their limitations were exposed in a classic review article by Koopmans.<sup>4</sup>

Young Simon Kuznets came into the NBER in the mid-1920's. In a brief span of years, he wrote three books on the analysis of economic time series: one on cyclical fluctuations, one on seasonal patterns, and one on secular trends. I believe Kuznets realized that with these three books he had exhausted the potential of the "economic indicators" framework, and therefore moved into national income accounting (NIA) as an intellectually tougher and more promising field.

During the early 1930's, economists in several industrial countries were developing ideas about "public works" and "counter-cyclical fiscal policy" with varying degrees of theoretical sophistication. J. M. Keynes' *General Theory of Employment, Interest, and Money* was the clincher.<sup>5</sup> By making national income, consumption, and investment the very core of his theory, he convinced many that responsible economic policy was impossible without good current estimates of the national income and its components.

Keynes (in 1939) set two bright young men—Richard Stone and J. E. Meade—to work on national income accounts under the auspices of the government of the United Kingdom, and their results, the first official national income accounts for the United Kingdom, were published in 1941. Simon Kuznets had begun publishing his national income accounts for the United States in the mid-1930's under NBER sponsorship.<sup>6</sup> These were extended by the U.S. Department of Commerce which began publishing the accounts in substantially their present form, with emphasis on the gross national product (GNP) in 1942.<sup>7</sup>

Almost simultaneously with Kuznets' national income estimates and Keynes' *General Theory* appeared Wassily Leontief's first input-output model of the U.S. economy<sup>8</sup> which amounted to a special disaggregation of the national income accounts for a single year, and Jan Tinbergen's econometric model of the United States<sup>9</sup> which tried to explain movements in the national income and its components over a series of years, 1919 through 1932. Tinbergen's model incorporated Kuznets' national income data,

and its structure was largely based on Keynes' theory.

The work of these great economists (Tinbergen, Kuznets, and Leontief have all received the Nobel Prize in Economic Science and Keynes would probably have been the first to receive it had he lived until this honor was initiated in 1969) imposed new standards of quality and consistency on economic data systems. National income accounts entered the Federal statistical program in the 1930's and input-output analysis in the 1940's (shakily at first, but rather steadily after 1961).

Econometric models of the Tinbergen type in the United States have been developed mainly outside the government, but some Federal agencies have been experimenting with them since the mid-1960's. To some extent, I think the Federal Government has defaulted in this particular field, which seems rather strange in this the 30th anniversary year of the Employment Act of 1946.

The depression fiasco of 1929-32 demonstrated the impossibility of steering the economy without road maps or headlights; the Employment Act of 1946 (it seems to me) made it illegal to drive the economy without a license!

### **The Social Indicators Movement and the Sociometric Revolution**

In 1966, during the Great Society period of Lyndon Johnson's administration, the "social indicators" movement sprang to life under impressive leadership, including such eminent sociologists as Raymond Bauer,<sup>10</sup> Bertram Gross,<sup>11</sup> and Philip Hauser. The need for this movement was succinctly expressed by Bauer: "For many of the important topics on which social critics blithely pass judgement, and on which policies are made, there are no yardsticks by which to know if things are getting better or worse."<sup>12</sup>

Albert Biderman<sup>13</sup> studied the 1960 report of President Eisenhower's commission on national goals.<sup>14</sup> This report listed 81 specific goals. Biderman searched *The Statistical Abstract of the United States* (1962) and *Historical Statistics of the United States from Colonial Times to 1957*, not for series that would actually measure performance or progress toward these goals but for series that were at least remotely relevant to phenomena that were pertinent to each goal statement. He found 48 goals to which some



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time series in these publications were relevant and 33 goals to which none of the included time series were relevant.

In my own thinking, the social indicators movement was associated with two others: the "accountability" movement that hit public universities in the mid-1960's and the PPBS movement in the Federal Government (1965-68) which required each agency to define its program elements and objectives and identify the resources used to promote each objective. Both movements attacked the traditional methods of resource allocation in non-market institutions or systems.

The accountability movement evidently required careful definition and measurement of the inputs and outputs of universities and a rationale for assigning equivalent dollar values to those which were not bought and sold in conventional markets.<sup>15</sup> A satisfactory solution to this problem seems to call for the generalization of national income concepts to include all inputs and outputs of the social system.<sup>16</sup> Thus, we might visualize a gross social product (GSP) which includes, but is much larger than, the GNP; also, an accounting convention which specifies that gross social product is equal to gross social income (GSI). I will expand these ideas in the next section.

I should like to point out that the early leaders of the social indicators movement consciously followed economic prototypes. In 1967, they helped draft a bill which was introduced in the Senate by Walter Mondale as "The Full Opportunity and Social Accounting Act of 1967." It provided for an annual Social Report of the President, a Council of Social Advisers, and a Joint Committee of Congress to review the recommendations made in the President's report and to issue its own findings and recommendations as a guide to the several committees of Congress dealing with matters covered in this report. Hearings were held in 1967 but no action was taken.

Much of the empirical work on social indicators during the late 1960's and early 1970's was open to the charge of "measurement without theory." By 1972, several mathematical sociologists were moving to rectify this situation. Kenneth Land<sup>17</sup> proposed that social indicators be identified as components in social system models—i.e., as variables in structural equation models of social processes. He adopted a terminology and formulation which are almost identical with Tinbergen's<sup>18</sup> "theory of economic



**“...explore the feasibility of implementing a system of social accounts...which would include the national income accounts and add up to a gross social product (GSP)...”**

policy,” one of the most fruitful ideas in economics since the 1930's.

In *Social Indicator Models*,<sup>19</sup> James S. Coleman (a sociologist) and Richard Stone (an economist) show remarkable agreement on the use of “transition accounts.” Otis Dudley Duncan, like Coleman a distinguished quantitative sociologist, is also represented in *Social Indicator Models* along with several of his younger associates. Duncan was also co-editor (with Arthur S. Goldberger, an outstanding econometrician) of a volume entitled *Structural Equation Models in the Social Sciences*<sup>20</sup>

These two volumes are landmarks in a sociometric revolution which is closely comparable to the econometric revolution of the 1930's and 1940's, and which is bringing sociologists and economists closer together. *Social Indicator Models* is an encouraging demonstration of what sociological research will be like under the new methodological regime. The suggestion of a Council of Social Advisers was premature in 1967; it may not be so in 1977.

### **Social Indicators and Social Theory: Elements of an Operational System**

I will proceed now to outline my own tentative integration of concepts from the various social sciences (including economics), the social accounting system to which they would logically lead, and the data system that would be required to implement it.

What am I aiming toward? At the most general level, I would like to contribute to an integration of theory, methods, and data across the “social” parts of the social and behavioral sciences. My specific objective for the next 2 or 3 years is to explore the feasibility of implementing a system of social accounts, in dollars, which would include the national income accounts and add up to a gross social product (GSP) much larger than the GNP. It would attach dollar values to all outputs from the social system to individuals and all inputs from individuals to the social system. The outputs received by individuals may be called rewards and the inputs supplied by individuals may be called contributions. Just as gross national product equals gross national income in the economic accounts, so the dollar value of total rewards to individuals (the gross social product) would equal the dollar value of total

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contributions by individuals (the gross social income) in the proposed system of social accounts.

This objective would require us to define an exhaustive set of rewards, a unit for measuring the quantity of each kind of reward, and a method for assigning prices (equivalent dollar values per unit) to each kind of reward. It would require us to do the same things with respect to contributions.

It is clear that social accounts require a complete accounting for *time*. There is a tradition of time budget or time use surveys going back as far as the 1920's; there is also a 1965 article by Gary Becker<sup>21</sup> which places time and money in a common framework. Time spent in household production is a major component of time use; time spent in school is another; time spent at work (producing GNP) is a third; time spent asleep is a fourth; and the rest of the 24-hour day is the fifth and final component.

T. W. Schultz, Gary Becker, James Morgan, and other economists have done good work on assigning dollar values to vocation and career education and to household production, extending economic theory and measurement to adjacent areas. I have taken a more radical approach, starting with Roger G. Barker's concept of "behavior settings" and Talcott Parsons' concept of "generalized media of social interchange."

What are the behavior settings? The concept was originated by Barker<sup>22</sup> in the late 1940's or early 1950's. Barker spent a good many years observing the behavior of residents of a small mid-western community of about 830 people. He early addressed himself to the question of how the environment of human behavior was to be identified, described, and measured. He concluded that the community environment could be divided into parts or units which he called behavior settings.

Barker says:<sup>23</sup>

"Behavior settings are units of the environment that have relevance for behavior. They provide the primary data of the study to be reported here. We have dealt only with the settings that occur outside the homes of the community, that is, the public behavior settings. The number of public behavior settings in a town is a measure of the size of the town's public environment.

"We must emphasize that a behavior setting coerces people and

things to conform to its temporal-spatial pattern. This is not an incidental or accidental characteristic. The person or persons who maintain and control the setting (the performers) make a deliberate effort to insure that this is so, and that the setting therefore fulfills its function. This aspect of a setting we call its program. Two settings are said to have the same program when their parts and processes are interchangeable. When this is true, two or more settings belong to the same genotype. Two grocery stores, for example, could exchange stock, personnel, bookkeeping systems, shelving, and so forth, with little interruption in their operation. They belong to the same genotype. A Methodist and a Presbyterian minister could, and sometimes do, exchange pulpits. The number of behavior setting genotypes in a town is a measure of the variety of the town's environment."

Barker identified 198 genotype settings in his town of 830 people. Examples include grocery stores, hardware stores, ice cream socials, kindergarten classes, business meetings, religion classes, hallways, bus stops, and many others.

When individual grocery stores, churches, and the like were recognized as separate or specific behavior settings, Barker found 884 public behavior settings in his town during the 366-day period September 1, 1963, through August 31, 1964. The durations of individual behavior settings ranged from 1 hour to 8,784 hours in that year, and totalled 286,909 hours. Multiplying the hours of duration of each behavior setting by the average number of persons participating in it at any given time, Barker obtained a record of "hours of occupancy" of behavior settings, totalling 1,129,295 in 1963-64. As there were 8,784 hours in the 366-day year (including February 29, 1964), the total hours of "life lived" during the year by the town's 830 residents was 7,290,720. About 15.5 percent of these hours were spent in public behavior settings; the remaining "hours of living" were presumably spent in private homes.

Barker<sup>24</sup> indicated that if his criteria for identifying public behavior settings were extended into private households, they would yield five behavior setting genotypes: home meals, home indoors, home outdoors, home bathrooms, and home festive occasions. Thus, he notes that his town had, as of 1951-52, some

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289 households and 1,445 specific household behavior settings. However, Barker concentrated all of his research efforts on the public behavior settings, those into which almost any resident of the town could enter.

I met Roger Barker at a small interdisciplinary symposium in October 1966, and the first aspect of my social accounting model was inspired by that meeting. As Barker presented his data,<sup>25</sup> it occurred to me that an individual could be viewed as allocating his time (24 hours a day) among behavior settings which collectively define his life style; simultaneously, he allocates his money (personal consumption expenditures) exhaustively among these settings.

The second aspect of my model was based on a 1968 article by Parsons.<sup>26</sup> I may have read more into his article than he himself intended. However, Parsons' concept of "generalized media of social interchange" and his characterization of outputs from the social system to individuals as "rewards" and of inputs from individuals to the social system as "contributions" play a major role in my present approach.

Money, said Parsons, is only one of a number of media of social interchange. Money circulates in the economy. In the polity or political system the corresponding medium is (political) power, and in the society the corresponding medium is influence. In more specialized subsystems of the society, reputation (as among doctors, lawyers, and scholars), faith (as among members of specific religious denominations), and ideology (as among members of doctrinaire left wing and right wing political organizations) also serve as media of social interchange. Parsons listed several other media including technological know-how and skill, affect (recognition and response), and others.

So, a second feature of my present model is this:

At the beginning of any year, the individual has an endowment of resources or capacities which he can use as inputs or contributions to the social system. These capacities may be clustered into five groups. The first three groups are inside the individual: health (physical, emotional, and mental); skills (work-related and other); and value commitments and character. Capacities in the fourth group are socially validated in the sense that they reflect the individual's evaluation by others: power in formal organizations (backed by written or unwritten job descriptions),

prestige, and political power. The fifth group includes rights to income from property and transfer payments, which again must be socially validated.

Combining the two aspects leads me to the following model<sup>27</sup> in which the individual seeks to maximize his utility by choosing an optimal life style subject to the constraints imposed by his endowment:

$$\begin{aligned} \text{Maximize } U &= f(x), \text{ subject to} \\ Ax &\leq b, \\ x &\geq 0. \end{aligned}$$

In these equations,  $x$  is a vector of the proportions of the individual's time that he spends in each of the  $n$  behavior settings he occupies;  $b$  is a vector of his  $m$  capacities or resources; and  $A$  is an  $m$  times  $n$  matrix whose typical element,  $a_{ij}$ , is the amount of the  $i$ th resource used per unit of time in the  $j$ th behavior setting.

In general, the individual knows about how much of each resource he must put into a behavior setting per hour of occupancy and about how much of each kind of reward he will get out of it. So, he spends all of the resources available to him in the course of allocating his time exhaustively among the  $n$  behavior settings. When the individual maximizes  $U=f(x)$  by choosing an optimal life style,  $x$ , a shadow price or marginal utility is associated with each resource in his endowment vector,  $b$ . Since one of these resources is money income (derived from his work-related skills and/or his property and transfer payments), the individual should be able to compare the marginal utility of an additional unit of each other resource to the marginal utility of an additional dollar of money income. In other words, the marginal utilities of his other resources can in principle be translated into dollar equivalents. When these dollar equivalents are multiplied by the corresponding resource quantities, we obtain estimates of the contributions of each resource to the individual's "total income," which, like the specific resource contributions, is expressed in dollars.

Table 1 is taken from a survey of the use of time by adults in the United States during 1966.<sup>28</sup> In table 1, the time available to each category of individuals (for example, "men, employed, married" in column 1) is allocated among 27 primary activities; these

Table 1—U.S. time use survey, 1966: Time spent by respondents in primary activities, by respondents' sex, employment status, and marital status

Primary activities	Men employed		Men unemployed		Women employed		Women unemployed	
	Married (1)	Single (2)	Married (3)	Single (4)	Married (5)	Single (6)	Married (7)	Single (8)
N=	449	72	16	6	190	152	342	17
Weighted N=	945	127	41	17	398	243	724	41
<i>All figures in hours per 24-hour day</i>								
1 Regular work	6.1	6.2	0.2	1.6	4.7	4.6	0.1	0.7
2 Second job	.2	.1				.1		
3 Nonwork breaks	.6	.6			.4	.5		.1
4 Trips to and from work	.7	.6		.1	.5	.5		
5 Preparing food	.1	.2	.5	.3	1.0	.5	1.6	1.1
6 Cleaning house	.2	.1	.8	.1	1.2	1.0	2.0	1.6
7 Laundry, mending		.1			.6	.3	1.0	.7
8 Other house upkeep	.3	.1	.1	.2	.3	.1	.4	.3
9 Gardening, pets			.1		.1		.1	.1
10 Sleep	7.6	7.5	8.5	8.4	7.7	7.5	7.7	8.3
11 Personal care	.9	1.2	.8	1.0	1.2	1.5	1.2	1.3
12 Eating	1.2	1.0	1.6	1.7	1.0	1.0	1.3	1.1
13 Resting	.3	.2	.4	.2	.3	.5	.4	.2
14 Child care	.1		.4		.4	.2	1.1	.9
15 Shopping	.4	.3	.6	.4	.5	.6	.7	.6
16 Nonwork trips	.8	.8	1.5	1.4	.7	.8	.9	.9

17 Education	.1	.5	1.5	1.9		.3	.1	.8
18 Organizations	.2	.2	.5		.1	.3	.4	.5
19 Radio	.1	.1				.1		
20 Television	1.7	1.4	2.6	1.9	1.0	1.2	1.6	2.5
21 Reading	.7	.6	.7	1.0	.5	.3	.6	.4
22 Social life	1.0	1.2	1.7	1.7	1.0	1.2	1.5	1.1
23 Conversation	.2	.2	.4	.2	.3	.3	.5	.3
24 Walking			.2					
25 Sports	.2	.1			.1	.1	.1	.1
26 Various leisure	.2	.2	.8	.2	.3	.3	.5	.3
27 Spectacles	.1	.3		1.5	.1	.3	.1	.1
<hr/>								
28 Work-related	7.6	7.5	.3	1.7	5.6	5.7	.1	.8
29 Housework	.6	.5	1.6	.6	3.0	1.9	5.1	3.8
30 Personal care	10.0	9.9	11.3	11.2	10.1	10.4	10.6	10.9
31 Family tasks	1.3	1.2	2.1	2.1	1.6	1.6	2.7	2.3
32 Education and organizations	.4	.7	2.0	1.9	.2	.5	.5	1.3
33 Mass media	2.5	2.2	3.4	2.9	1.6	1.6	2.2	2.9
34 Leisure	1.7	2.0	3.2	3.6	1.8	2.2	2.8	2.0
<hr/>								
35 Grand total	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
36 Free time	4.8	5.1	9.0	8.6	3.9	4.8	5.9	6.4

Source: John Robinson and Philip E. Converse, *Sixty-six Basic Tables of Time Budget Data for the United States* (Ann Arbor, Mich.: Survey Research Center, Univ. Mich., May 30, 1966). 11 pages plus 66 tables (xeroxed). Adapted from table 1.



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figures total 24 hours a day, and are averages for a 7-day week. For example, the average time spent by married men, employed, in regular work was 6.1 hours a day, or 42.7 hours per week. Rows 28-34 of table 1 cluster these 27 primary activities into 7 groups: work-related, housework, personal care (including sleeping, eating, resting, and personal care in a narrow sense), family tasks, education and organizations, mass media, and leisure. The time allocations vary considerably between categories of adults differentiated by employment status, marital status, and sex.

The 1966 survey of time use contains three other tables, one on secondary activities (such as listening to the radio while primarily engaged in housework); one on the categories of places where time was spent; and one on the categories of persons with whom time was spent. To characterize any real human allocation of time, we must employ the four principles of classification simultaneously. Symbolically,  $T=f(Pa, Sa, Pl, Pe)$ , where  $T$  is time,  $Pa$  is primary activity,  $Sa$  is secondary activity (if any),  $Pl$  is "place where," and  $Pe$  is "persons with whom." Unfortunately, the 1966 survey applies each principle of classification separately and independently of the other three. Symbolically, its four tables give us  $T=f(Pa)$ ,  $T=f(Sa)$ ,  $T=f(Pl)$ , and  $T=f(Pe)$ ; we cannot synthesize the true time allocation function  $T=f(Pa, Sa, Pl, Pe)$  from this information with any degree of assurance.

Nevertheless, I have tried in table 2 to show what such a synthesis would look like and what it would imply. Table 2 describes the time allocation of a "man, married, employed." Each column of table 2 is, or belongs to, one of the 27 primary activities of table 1. However, certain primary activities have here been divided into two or more different behavior settings, giving a total of 46 behavior settings (hence 46 columns) in all.

For example, the first column indicates that the individual spent 2.7 hours in Behavior Setting 1, in which the primary activity is regular work, the place occurring is "place of work" and persons involved are "all alone;" the individual is alone in his office and is not engaged in any secondary activity. The second column indicates that the individual spent another 2.6 hours in Behavior Setting 2, in which the primary activity is regular work, occurring at the place of work, but involving interactions with colleagues. Each of the remaining 44 columns can be interpreted in a similar manner; the number of hours adds up to 24 per aver-



age day.

In table 3, I have allocated the time of a "man, married, employed" among nine behavior setting aggregates. The central portion of table 3 is a condensation of table 2. The "value per hour (ri)" row represents a "total price per hour," and the four bottom rows represent the proportionate allocations of time and three other categories of resources among the various behavior setting aggregates. The figures in the five rows just mentioned are illustrative only.

Figure 1 is an example of the kind of data sheet Roger Barker and his associates filled out for each of the 884 behavior settings of Midwest in 1963-64. The occupancy time of town residents in each behavior setting is disaggregated among seven age groups, the two sexes, and four socioeconomic classes. The "maximum penetration" of each subgroup into the behavior setting is recorded. (Zone 5 is occupied by the officials who jointly control the setting; if there were a single leader or official in control of the setting, he would be the sole occupant of Zone 6. Zones 4, 3, 2, and 1 are successively less central and less important to the operation of the setting than are Zones 6 and 5.) Each behavior setting is rated on 11 action patterns and five behavior mechanisms, plus certain other characteristics.

I will not try to describe Barker's system in more detail. The best single description is Barker's 1968 book;<sup>29</sup> however, to get the full picture, the reader is also referred to his other works.<sup>30</sup> To the best of my knowledge, Barker has made the most complete and detailed observations of the activities of all members of a small but relatively self-contained social system that have been made in the United States.

Barker compared the 198 behavior setting genotypes available in his town with the entries in the classified telephone directory of a midwestern city of 800,000 people. He concluded that, if manufacturing and wholesaling enterprises were disregarded, about 80 percent of the behavior setting genotypes available in the metropolis were available in his town. About 85 percent of the consumer goods used by residents of his town of 830 people could be purchased from its various retail enterprises. Thus, if one could develop a comprehensive system of social accounts for Barker's community, as much as 80 percent of the task of conceptualizing and designing a national system of social accounts might be







accomplished.

Table 4, based partly on Barker's data, illustrates the time allocations of residents of a small town among behavior setting clusters, by population categories. Approximating the distribution of the U.S. population in 1963, I have assumed that employed adults constitute 40 percent of the town's population; adults not employed, 26 percent; adolescents and children in school, 24 percent; and preschool children, 10 percent. The time allocations among public (nonfamily) settings are based on Barker's data; time allocations among family settings are based on the 1966 time use survey (for adults) and upon personal judgment for adolescents, school children, and preschool children.

Table 5 illustrates, for the same hypothetical small town of 1,000 residents, the distribution of the outputs of behavior setting aggregates among the various population categories. The figures in table 5 assume that the money income per employed adult for current personal services is \$8,000 a year and that 400 adults are employed. Hence, the money income of the town's residents for personal services would be \$3,200,000; the nonmoney rewards or outputs of the town's social system would be valued at \$14,480,000 minus \$3,200,000, or \$11,280,000. If I added another \$2,000 per worker for income from property and transfer payments (the national average share of such income in personal income from all sources is about 20 percent), the community would have a money income of \$4,000,000 and a total income of \$15,280,000. The nonmoney income would be about 2.8 times as large as the money income.

I hold no brief for these particular figures; considering that only about 10 percent of total living time, or 15 percent of the total waking time, of the town's population is directed conspicuously toward the production of GNP, the ratio of nonmoney to money income does not seem outlandish. However, I must stress again that these figures are *illustrative only*.

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I am working intensively now with Barker's data, trying to integrate it with data from the U.S. census on occupations, industries, education, and earnings, and data on Americans' use of time in 1975-76 from the SRC (Survey Research Center, University of

Table 3.—Man married, employed: Illustrative rearrangement of time budget data from table 2 into larger aggregates of behavior settings and categories of activities, places, and persons

Item	Behavior setting aggregates									
	1	2	3	4	5	6	7	8	9	Total
	Work- related (1)	House- hold pro- duction (2)	Family tasks (3)	Sleeping and resting (4)	Personal care (5)	Eating (6)	Mass media (7)	Leisure settings (8)	Educa- tion, spent organ- izations (9)	hours spent all settings (10)
Primary activity (hours)	7.6	0.6	1.3	7.8	0.9	1.2	2.5	1.7	0.4	24.0
Value per hour ( $r_1$ )	1.0	1.0	1.5	0.2	1.5	3.0	0.7	2.0	2.0	
Secondary activities (hours)						1.1	2.5	1.7		5.3
Place occurring										24.0
Place of work										6.5
At home or just outside		0.6	0.5	7.8	0.9	1.0	2.5	0.6		13.9
Another's home								0.5		0.5



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Figure 1—Data sheet for high school boys' basketball game

Name: High School Boys' Basketball Game									
Genotype #	1-3:	0	1	8	Genotype Commonality #	8:	9	Locus	16: 1
B S #	4-6:	0	0	5	Authority System	13-14:	0	1	No. of Occur. 17-19: 0 0 8
Genotype Date	7:	3	Class of Authority Systems	15:	4	Survey #	20:	5	
Occupancy Time of Town Subgroups				Max. Penetration of Subgroups			ACTION PATTERN RATINGS		
Group	No. P	Hours	Of Code	Group					
Inf.	3	24	21-22: 0 4	Inf.	21:	1	Aes:	53:	0
Presch.	12	54	23-24: 0 5	Presch.	22:	2	Bus	54:	1
Y S	10	87	25-26: 0 6	Y S	23:	2	Prof	55:	1
O S	18	258	27-28: 0 9	O S	24:	4	Educ	56:	1
Town Child	43	423	29-30: 1 1				Govt	57:	1
Adol	63	1720	31-32: 1 7	Adol	25:	4	Nutr	58:	1
Adult	72	1676	33-34: 1 7	Adult	26:	5			
Aged	7	81	35-36: 0 6	Aged	27:	2	PersAp	60:	2
Town Total	185	3900	37-38: 2 3	Grand Max	28:	5			
Males	97	2264	39-40: 1 9	Males	29:	5	PhysH	62:	2
Females	88	1636	41-42: 1 7	Females	30:	4	Rec	63:	8
I	35	600	43-44: 1 2	I	31:	4	Rel	64:	0



II	105	2236	45-46:	1	9	II	32:	5	Soc	65:	6			
III	42	1014	47-48:	1	4	III	33:	4	MECHANISM RATINGS					
N-G	3	50	49-50:	0	5	N-G	34:	4	AffB	66:	9			
POPULATION (number)														
Town Child		51-53:	0	4	3	PERFORMERS (number)								
Out Child		54-56:	1	8	7	Town Child	35-36:	0	1	Manip	68:	7		
Total Child		57-59:	2	3	0	Out Child	37-38:	0	0	Talk	69:	9		
Town Total		60-62:	1	8	5	Total Child	39-40:	0	1	Think	70:	4		
Out Total		63-65:	9	3	7	Town Total	41-42:	5	3	GEN RICH:	71-72:	23		
Grand Total		66-69:	1	1	2	Out Total	43-45:	2	4	PRESSURE RATING				
Grand O.T. (code)		70: blank				Grand Total	46-48:	3	0	Children	73:	4		
Total Duration		71-73:	0	3	1	Perf/Pop	49-50:	2	7	Adolesc	74:	2		
		74-77:	0	0	2	Aver. No.	51-52:	8	4	Children	75:	0		
						WELFARE RATING								
						Adolesc						76:	3	
Average Attendance						78-80:						3	6	3
												</		

Table 4—Illustrative time allocations of residents of a small town among behavior setting clusters, by population category

Population category	Nonfamily settings							Family settings			Pro- por- tion of town popu- lation (12)
	Busi- ness places (1)	Schools (2)	Govern- ment agencies (3)	Churches (4)	Social life, leisure (5)	Traffic- ways and family hallways tasks (6)	House- work, family tasks (7)	Per- sonal care (8)	Mass media, leisure (9)	Out-of- town settings (10)	Total time (11)
A. Percent of total time of each population category											
Town residents											
Adults, employed	12.50	0.25	2.50	0.25	2.00	2.50	15.00	42.00	11.00	12.00	100.00
Adults, not employed	7.70	—	0.60	0.40	3.00	0.80	30.00	44.00	11.50	2.00	100.00
Adolescents and children in school	0.80	10.90	—	0.50	2.50	1.30	5.00	50.00	27.00	2.00	100.00
Children, preschool	1.35	—	—	—	1.35	0.60	1.40	58.30	35.00	2.00	100.00
Total population	7.33	2.72	1.16	0.32	2.34	1.56	15.14	46.07	17.36	6.00	100.00



Table 5—Distribution of outputs of behavior setting aggregates in a small town to various population categories, based on hypothetical data

Behavior setting aggregates in which outputs are produced	Recipients of behavior setting outputs				Total population
	Adults, employed (1)	Adults, not employed (2)	Adolescents and children in school (3)	Preschool children (4)	
	Proportion of each resource of each population category				No.
1. Firms					
Time	0.225	0.077	0.008	0.013	0
Group 1	.225	.077	.008	.013	432
Group 2	.400	.150	.015	.013	804
Groups 3 and 4	.850	.150	.015	—	4,438
2. Schools					
Time	.003	—	.109	—	0

Group 1	.003	—	.109	—	110
Group 2	.015	—	.220	—	130
Groups 3 and 4	.015	—	.220	—	178
3. Social settings					
Time	.072	.048	.043	.020	0
Group 1	.072	.048	.043	.020	199
Group 2	.185	.250	.165	.020	637
Groups 3 and 4	.035	.250	.165	—	832
4. Family settings					
Time	.700	.875	.840	.967	0
Group 1	.700	.875	.840	.967	2,899
Group 2	.400	.600	.600	.967	1,649
Groups 3 and 4	.100	.600	.600	—	2,172
Value of behavior setting outputs per capita of total population (dollar equivalents: money income per employed adult= \$8,000)	8,000	4,160	Dollars 1,920	400	14,480

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Michigan) survey currently underway. (I participated in developing some of the questions for this survey, but as of June 22, 1976, the data were not yet ready for analysis).

A data system based on my approach need not intrude upon individual privacy to a significant degree. The time series data required could be based largely on sample surveys of *behavior settings* rather than of individuals. A behavior setting is equivalent to a small establishment; indeed, many of Barker's behavior settings, such as grocery stores, barber shops, and service stations, are identical with establishments as reported in the various economic censuses. In measuring the characteristics of a behavior setting, it is not necessary to identify the particular individuals who are occupying the setting. And, in basing national accounts on samples of establishments and other behavior settings, it would not be necessary to reveal the identities of the individual establishments in the sample.

In addition, rather small sample surveys of the use of time by individuals and households could be used to "true up" the basic series derived from surveys of behavior settings.

My approach may be particularly useful in international comparisons of economic and social well-being. For example, I grouped about 120 countries of the world as of 1970 into five classes according to GNP per capita (in 1970 U.S. dollars). I then regressed a number of demographic, economic, and social variables upon the GNP per capita categories and converted the regression coefficients into a rough index of "total income per capita," made up of four subindexes, for the five groups of countries. The subindex for life expectancy and health increases much less rapidly than the index as a whole. In contrast, the subindex for commitment to modernization (based on per capita use of modern means of transport and communication) rose somewhat more rapidly, and an index of GNP per capita much more rapidly, than the index as a whole. The ratio of GNP per capita in the highest of the five GNP groups to that in the lowest was about 24 to 1; the ratio of the index of total income in the highest GNP group to that in the lowest (crudely calculated) was about 6 to 1.

Richard L. Meier has asserted that the real output of a social system is substantive interactions among people. William Alonso has reminded overzealous proponents of "new towns" that there is

**"...there is a limit to the extent to which bricks and mortar can improve the human condition."**

a limit to the extent to which bricks and mortar can improve the human condition: the real city is people and organizations, and the buildings are only their containers.

These observations, together with the "total income" concept, suggest a new approach to the problem of design (of houses, automobiles, cities, or whatever). What are the minimum amounts of scarce materials and energy required to support a pre-specified level of substantive and enjoyable interactions among people? Or, what is the minimum amount of GNP per capita required to support the present U.S. level of "total income" per person?

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<sup>3</sup> Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles*. New York: Nat. Bur. of Econ. Res., 1946.

<sup>4</sup> Tjalling C. Koopmans, "Measurement Without Theory," *Review of Economics and Statistics*. 29, Aug. 1947, pp. 161-172. I do not mean to leave a distorted impression of Wesley C. Mitchell. Mitchell was a very great economist who in early and mid-career wrote classic works on a history of the greenbacks and their contribution to inflation during the Civil War; on business cycles; and on the making and using of index numbers. Mitchell was largely responsible for the founding of the National Bureau of Economic Research, and served as its director from 1920 until 1945. In addition to his own work on economic indicators and business cycles, he had the breadth of vision to support the development of national income estimates by W. I. King in the 1920's and by Simon Kuznets in the 1930's. Mitchell was correct in recognizing that large masses of data would have to be carefully and systematically organized to provide an empirical basis for business cycle research. The data Mitchell developed as "economic indicators" also proved essential to Kuznets' estimates of national income and to Tinbergen's econometric model; otherwise, Keynes' theory might have gone unsupported by measurement for a good many years.

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<sup>11</sup> Bertram M. Gross, "The State of the Nation: Social Systems Accounting." *In ibid.*

<sup>12</sup> Bauer, *op. cit.*

<sup>13</sup> *In Bauer, op. cit.*

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<sup>20</sup> Arthur S. Goldberger and Otis Dudley Duncan (eds.), *Structural Equation Models in the Social Sciences*. New York: Seminar Press, 1973.

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# **Appraising the Economic Performance Of the Food Industry**

**George E. Brandow**

**Lecture 5**

**September 8, 1976**

After the turmoil about food prices during the past 4 years, little documentation seems necessary to establish the economic importance to the American people of the vast industry that processes and distributes food. Collectively, questions asked by consumers, farmers, political leaders, and others amount to a demand for comprehensive information about the economic performance of the food industry. Such questions state or imply concerns about efficiency of the industry, the level of its profits, the presentation of products to consumers, and other matters I shall describe in more detail later. Loosely speaking, performance means how well an industry does the things that society might reasonably expect it to do.

Economists asked to appraise the economic performance of an industry have a difficult task. If they confine themselves to the elegant abstractions of rigorous general theory, they find few handles by which to grasp the inelegant real world and are wholly unprepared for some of the institutional and dynamic characteristics of the industry. If they adopt the approach of industrial organization economics, they find standards imprecise, measurement both conceptually and empirically difficult, and judg-

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ment usually necessary to reach conclusions. Yet to insist on elegantly derived results that are fully conclusive and leave no room for judgment is to require the impossible. The facts are that *good performance* is a set of sometimes conflicting goals; the economic world is complex, changing, and never fully knowable; and the economic results of interest range along continuous scales from good to bad rather than being clearly one or the other. Economists must accept this if they are to produce valid information, and the public must accept it if effective use is to be made of such information for policy purposes.

Appraisal of performance of the food industry necessarily draws heavily upon ideas already a part of industrial organization economics. Yet conventional versions of this area of economics are somewhat deficient for the purpose in at least two respects. First, heavy emphasis on market structure, especially on concentration, tends to obscure important relationships within the vertical economic sectors that perform the successive functions of producing raw materials, processing them, and distributing raw and finished products. Second, industrial organization economics ordinarily considers firms as the only economic units whose decisions bear directly or indirectly upon performance. Yet it is obvious that labor unions and government make important decisions influencing performance. *Industry*, for the purpose of appraising performance, should include all decisionmakers and performers.

This paper is limited to appraisal of performance, but understanding the determinants of performance and analyzing possible ways of improving performance are also necessary for effective policy formulation. Certainly, identification of an instance of particularly good or bad performance does not also explain it, and understanding why a particular result occurs does not automatically reveal all possible corrective measures or their full consequences. Structure, conduct, and performance have become so fused and holy a trinity in industrial organization economics that I feel the need to point out that I am concentrating on one without denying the importance of the others.

### General Comments on Performance

Several broad assumptions lie behind the criteria for economic

performance to be discussed shortly. Some require explicit comment to explain the choice of criteria and the difficulties met in appraising performance.

Performance is defined from the standpoint of society, not of participants in the industry or of any single group outside it. The role of consumers is crucial, however. My test of what should be produced by the food industry is the selection of products that would be made by fully informed consumers given a wide range of choices at prices just sufficient to cover necessary costs of making the products available. *Kind of product* includes packaging, food additive content, etc., as well as type of food. The mix of products satisfying this test is not necessarily what the food industry would like to sell, farmers would like to produce, nutritionists would recommend, or consumer spokesmen think would be good for consumers. Neither does the test give consumers all they want, for prices must be sufficient to compensate all those who directly or indirectly participate in supplying food efficiently. In a time of general inflation or short domestic supplies of raw foods, most



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consumers would be unhappy even though the test were satisfied.

The test places much reliance on market behavior of consumers but does not accept the actual market as a fully satisfactory setting for the test. The main reasons are that consumers are not fully informed buyers, strong efforts are made by sellers to influence consumers' decisions, and prices are not always consistent with necessary costs (including raw food prices). It seems possible to set up better market tests experimentally, but only at much expense. A more practicable procedure probably is to infer at least the directions in which consumers' choices would differ from actual patterns by methods suggested in a following section. Despite its shortcomings for the test of ideal product mix, however, the market is an invaluable first approximation, and evidence should be required before modifications of its results are accepted as standards.

As already suggested, balanced appraisal of performance of the food industry requires examination of the activities of all who participate in the industry. This includes business firms, labor unions, farmer and consumer cooperatives, and the government in its various regulatory roles. Few points so forcibly call to attention the political context in which questions about performance exist. Typically, each economic group wants the activities of other groups to be scrutinized but expects its own virtue to be taken for granted. Though studies of some aspects of performance arouse little resistance, others meet intense political opposition. The difficulties involved in getting sustained support through the political process for thorough appraisal of the performance of the food industry (or of any other industry) seem at least as formidable as the difficulties of making the economic evaluations.

Appraisal of industry performance requires a distinction between economy-wide goals and policies on the one hand and criteria appropriate for individual industries on the other. For example, even though high-level employment is a leading national objective we should not require an industry experiencing declining demand for its products, dwindling supplies of vital raw materials, or rapid advance in labor-saving technology to maintain or increase its labor force. Though overall price stability is an avowed national objective, we cannot expect a particular industry to maintain steady prices if economy-wide forces inflate costs and money demand, nor should we require price stability of an indus-

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**“An individual industry approach to (our economic problems) would cause chaos and be self-defeating.”**

try facing special demands or unique changes in costs. If the low purchasing power of poor people for food is regarded as a problem, as it is, the appropriate remedy is somehow to increase their purchasing power, not to ask the food industry to offer its products to the poor at special prices. In short, many of our economic problems must be attacked on an economy-wide level. An individual industry approach to them would cause chaos and be self-defeating.

### **The Elements of Performance**

The central task is to identify the principal criteria for performance applicable to the food industry, to indicate how empirical evidence might be obtained concerning each, and to suggest standards that might be applied in appraising individual elements of performance. A full-length book would be required to do these things in detail for the highly complex, diversified food industry.<sup>1</sup> No final word on standards seems possible. Here, it is necessary to use generalizations, to indicate directions rather than specific routes, and to forego debate with those who will not agree with what is said.

#### **Product Presentation to Buyers**

The first criterion concerns the variety, quality, healthfulness, and packaging of foods offered to buyers, together with information about the products. Problems occur principally at the retail level of sale, where buyers are consumers. Difficulties may exist at wholesale and farm levels of sale, but the much greater knowledge of commercial buyers, the frequent availability of grades, and the feasibility of using technical specifications ease potential problems there.

Wide variety is clearly necessary to meet consumer demand, and is essential for providing a test of consumer preferences at necessary prices. Variety can be overdone; if false impressions of product differences lead to specious variety, the added inventory and related expenses are not worth their cost. Food safety and wholesomeness clearly require some public regulation and monitoring of the food supply, but the appropriate boundaries of regulation and the tolerances to accept remain gray areas about

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which I have little to say.

Information needed for effective consumer choice is of several kinds. Again, the topic is familiar. The list includes such matters as nutritive values, objective indications of quality, package and unit prices, and open-dating. A crucial need is to substitute accurate knowledge of intrinsic value for impressions created by promotion and merchandising techniques. The high susceptibility of consumers to such techniques is a basic reason for excessive selling costs and for inefficient distribution methods sometimes used for highly promoted products.

Appraisal of this broad element of performance can proceed in several ways. Food safety and wholesomeness often can be judged by testing samples of products on the market and by examining the production methods and inspection procedures to which foods are subjected. Long-run health risks possibly associated with certain foods and food additives must be technically evaluated, which can be a slow and uncertain process in borderline cases. The adequacy of variety can be judged by observing whether markets offer apparently feasible choices to consumers. In particular, when one product is displacing another, do consumers have alternatives that provide a valid test of consumer choice?

It seems possible to make objective tests of quality and taste characteristics of many foods, to ascertain price differentials at which various qualities and brands are offered, to learn the state of consumers' information about the choices before them and to put the findings together to identify instances in which consumers' purchasing behavior differs from what it would be with full information. Sufficiently comprehensive and integrated research of this kind is virtually never done. Such research seems necessary for identifying instances in which market choices are imperfect, for producing data needed for consumer education, and for judging the potential usefulness of consumer grades.

**Efficiency in Processing and Distribution**

The pragmatic criterion of efficiency is whether necessary functions are performed at least cost in light of input prices and technical knowledge about methods and products. Efficiency ordinarily requires the use of up-to-date technology, achievement of economies of size, productive use of labor and other resources, effective use of transportation facilities, and so on. Efficiency can



be studied at the level of individual plants, of groups of plants within firms, and of processes involving several firms. In the broadest sense, systems analyses are required to identify the least-cost ways of moving foods from the raw material stage to consumers' shopping bags.

Estimates of least-cost levels can often be made from information about the operating experience of firms performing functions in different ways, on different scales, or with different management techniques. Or, more simply and therefore more practicably, the effect on costs achievable by introducing an available but little used economy may be made. Establishing empirical functional relationships such as between unit costs and levels of inputs can be useful in judging achievable efficiencies. Observation of methods in other industries performing similar functions or of the food industry abroad may be instructive. Economic and engineering data may permit good estimates of costs under circumstances not found in actual practice. Analyses of costs of alternative distribution channels, of transportation methods, and of vertical coordination are especially pertinent to appraisal of overall efficiency of the complete vertical system.

Judgments as to achievable minimum costs must be realistic. All firms cannot be expected to be completely up to date when new technologies become available at a rapid rate or when markets or sources of raw materials shift quickly. Good or bad luck is often a reason why particular plants or firms have low or high costs at a particular time.

An important consideration in the context of appraising performance is the incidence of inefficiencies found in the system. If high-cost firms are losing money, then not all (perhaps none) of excessive costs are being transmitted to others, and a process is underway to correct inefficiency. But if profits are good despite clear inefficiencies, performance must be rated poor and reasons for the situation investigated.

Work rules, terms of compensation, and other conditions insisted upon by labor unions apparently cause numerous instances of inefficiency in the food industry. But since equity is wanted as well as efficiency, specific standards of performance are often hard to state. The minimum work week in the meat packing industry is an example of a cost-increasing provision that seems warranted on equity grounds. Labor contract terms designed to

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protect indefinitely the jobs of delivery truck drivers in some fluid milk and bread markets, at the cost of perpetuating inefficient distribution methods, seem unwarranted.

Appraisal of government regulations encounters similar difficulties. Meat inspection increases costs but is thoroughly warranted by its benefits. Some interpretations of the Robinson-Patman Act that reduce efficiency in transportation and product handling seem devoid of offsetting benefits. In both the labor and regulatory fields, information on costs and benefits can have important educational value because the impression is so commonly created that there are no costs or, alternatively, no benefits.

**Progressiveness**

Development of new methods and products is, of course, an important means by which the food industry has improved its performance. A large part of the technology embodied in new or improved equipment is developed by manufacturers who sell to the food industry and often represents rather simple adaptations of science and technology broadly applicable to many industries. One way of judging progressiveness, therefore, is to observe the rate at which broad technology (e.g., automated warehousing) is applied to the food industry. Processing methods unique to the food industry and new products are more difficult to evaluate, for knowing what might potentially be done is virtually impossible. An absence of new methods or products is not a fault if the current scientific opportunity for developing them is zero, and substantial but lagging adaptation of innovations being used elsewhere is open to criticism. A flood of so-called new products is of little value if most of them are trivial variations concocted as merchandising devices.

Statistical series such as labor productivity data and farm-retail price spreads often give, directly or indirectly, useful indications of gains attributable to progressiveness and increased efficiency. Judgments may be possible as to whether the industry is seeking and is receptive to innovations. For example, are retailers and packers experimenting with various forms of central meat cutting? Expenditures on research and development are useful in this connection but are not conclusive because scientific opportunity varies from industry to industry and because much R&D in the food

industry appears to be for minor product differentiation of little significance to society.

### **Selling Costs**

The social usefulness of selling costs is highly controversial. Some selling costs are warranted to inform buyers about product availability, uses, and prices or to arrange buyer-seller transactions. An additional consideration is that if enterprisers are to be innovative and efficient, they need an opportunity to tell prospective buyers about the results of their efforts. But when selling costs average 15 to 20 percent of prices, which is above normal but not unheard of in the food industry, no amount of ingenuity can make a persuasive case for them.

It seems possible to devise rough estimates of how much advertising is needed to make buyers well aware of sellers' offerings of products. Possibly, one-half of 1 percent of sales would suffice for food retailers and 3 percent of sales for food manufacturers of genuinely differentiated products. Advertising costs greater than these amounts and all giveaways (e.g., trading stamps, prizes) would be considered excessive when appraising performance. Promotions that are really price cuts would not be criticized on grounds of selling costs. Crude as it is, such a procedure would be better than considering all selling costs acceptable or considering them all objectionable.

It seems likely that the effects of strategies of which intensive advertising is a part are not limited to excessive promotion costs. The National Commission on Food Marketing found that retail prices of nationally advertised brands of common foods averaged 20 percent higher than retail prices of private label products of comparable quality. The difference cannot be fully explained by advertising costs and seller profits. Tracking down the difference would be revealing about other marketing costs that often accompany intensive advertising.

### **Returns to Factors of Production**

Corporation profits are by far the most commonly discussed aspect of this element of performance. The high sensitivity of the public to profits apparently is due mainly to conceptions about what is equitable and to often distorted impressions of the importance of profits to prices. Resource allocation, which econo-

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mists usually emphasize, rarely stirs up the public.

The most useful single profit calculation for performance purposes is average after-tax profit of all firms in the particular branch of industry over, say, 3 years, expressed as a percentage of net worth. An appropriate standard for profit rates is the average return on long-term government bonds over a similar period plus an allowance for risk incurred by equity capital. In the absence of detailed study of the question, I tentatively suggest that adding 3 percent to the government bond rate will give a reasonable rate of return in most of the food industry.

But departures from any standard should be recognized in special circumstances. The marginal rate of return on new capital, invested in modern plants in the right locations, apparently was considerably higher in the meat packing industry in the 1950's than the modest rate earned on old capital. Industries that should be much expanded usually require higher-than-average profit rates; then a supplementary test is the rate at which the industry is in fact expanding. Industries with declining markets probably will retain adequate capital at below-standard profit rates.<sup>2</sup>

An insufficiently examined area is the extent to which income that otherwise would appear in profits in particularly successful firms or in especially good years ends up, instead, as additional advertising, as unusual compensation or other benefits for management or labor, or as additions to other expense categories. Inventory valuation is another accounting question. Accounting procedures that satisfy IRS may not be satisfactory in several respects for appraising economic performance.

Another rate of return to a factor of production is interest on borrowed capital. Ordinarily, interest paid on borrowed funds is established under circumstances giving little reason to suppose that the rate is higher or lower than necessary to obtain capital.

Rates of return to labor and management employed in the industry raise questions of equity and allocative efficiency, just as do profit rates. The suggested standard for comparison is average rates paid to comparable employees in other industries. It may be true that executives are overpaid relatively to blue-collar and office workers or that unions push up wage rates in the economy faster than productivity rises, contributing to cost-push inflation. But both questions are broader than any one industry and cannot be dealt with on an industry-by-industry basis. Single-industry

compensation rates that conform with the general pattern in American industry should not be considered poor performance even though the general situation may call for economy-wide reform.

### **Stability of Prices, Output, Employment**

As already indicated, a single industry should not be expected to have stable prices, output, or employment when changes elsewhere in the economy impose instability upon the industry or require long-term expansion or contraction for allocative efficiency. But an industry should not itself be a source of instability. For example, unstable hog slaughter is not poor performance if induced by unstable hog supplies. And, unstable hog supplies are not poor performance to the extent they are caused by variable feed supplies. But the hog cycle appears to be largely self-generated, while some weekly and monthly variability in hog slaughter perhaps could be feasibly eliminated by improved vertical coordination of packer and producer operations. Unnecessary variability represents poor performance.

Storage, futures markets, and production or sales contracts come under consideration when stability in markets for certain products is at issue. Market incentives can be expected to eliminate only variability that is sufficiently large and predictable to create profits for those who undertake storage or engage in other stabilizing activities. If market incentives do not adequately reflect all social benefits of stability, as may be true in grain markets today, then government policy to increase stability may be desirable. In such cases, the industry is not to be censured, but the incentives presented to it are to be changed.

### **Fair Conduct**

Ethical standards generally accepted for conduct of individuals should also be applied to firms, labor unions, cooperatives, and government representatives involved in an industry. For example, deception by firms, strong-arm methods by labor unions, and falsification by government meat inspectors are objectionable on performance grounds alone. Most such practices are also objectionable as distortions causing inefficiency, misleading presentation of products, excessive profits, or other aspects of poor performance. Also under fairness of conduct can be included dis-

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## George E. Bradow

crimination against women, racial minorities, or other groups to the extent that industry-wide practices contribute to them.

### Price Coordination

For the purpose of appraising performance, price coordination requires that price signals presented by the food industry to farm producers and to consumers be appropriate for guiding their production or consumption decisions. The food industry should not only be internally efficient and inclined to stability, it should transmit proper incentives to the economic groups with which it interfaces. Substantial overlap exists between this criterion for performance and preceding ones, but additional requirements are also involved.

One aspect of price coordination is the closeness with which prices move together at farm and retail levels of sale when processing and distribution cost conditions are stable but raw material supplies vary. For example, if retail lettuce prices decline little or only with a long lag when farm prices fall sharply as supply increases, consumers are insufficiently encouraged to buy and growers are too much discouraged from producing next year. If retail prices also respond too little to decreased supplies, price variability and risk are increased for producers, while consumers lose from unwarranted stability. Two other important aspects of price coordination are appropriate price differences among varieties, grades, or locations of products, and appropriate price differences between points in time.

Calculations of farm-retail price spreads and study of leads and lags in the food price system are useful in describing how the system works. Only detailed examination of the branch of the food industry involved will show whether other behavior would be feasible. Detailed analysis of particular situations is also required for appraisal of price differences among forms of products, locations, and points in time.

### Externalities

Externalities are taken here to mean economic costs or benefits significant to society but not fully accounted for in the calculations of decisionmakers, here principally food firms. Effluents discharged at little cost into the air or streams are familiar examples of external costs. Externalities are easier to identify than to



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**“...reform of political attitudes is a necessary condition for thorough appraisal of industry performance.”**

evaluate. Most of the issues have been thoroughly discussed by economists; none seem unique to the food industry.

Advertising, especially TV advertising, involves externalities in that costs and benefits to the public are separated in ways that cause usual internal evaluations and market tests of consumer choice impossible to make. The consumer receives *free* TV programs of the types that advertisers will pay for. But, the consumer bears the cost mainly in prices paid for consumer goods. No decisionmaker makes a choice that directly or indirectly incorporates all the costs and benefits significant to society. The difficulty of knowing the costs and benefits external to the decisions actually made is one reason for the controversy surrounding selling costs.

### **Agency Roles in Obtaining Data and Appraising Performance**

Thorough appraisal of the economic performance of the food industry would be a large undertaking. It would require a continuing effort, for the task is too great to accomplish in a short time and because the economic world keeps changing. Since public concerns about industry performance are not limited to food, study of the food industry presumably would be part of a larger ongoing examination of industry performance in general.

At the present time, a number of agencies study certain aspects of performance of the food industry or topics closely related to it. Included are the antitrust agencies; government agencies, principally ERS, that do research on food economics; agencies responsible for monitoring the healthfulness and wholesomeness of the food supply; agencies, principally the Bureau of the Census, that collect industrial statistics; the President's Council of Economic Advisers and a few Congressional committees; and universities in which economic research is conducted. The missions, powers, and competencies of each give the individual agencies certain comparative advantages in making particular types of studies. I shall suggest some revisions of activities to achieve a more comprehensive and coordinated total effort. Some may seem politically unrealistic, but as I remarked earlier, reform of political attitudes is a necessary condition for thorough appraisal of industry performance.

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### Federal Trade Commission

Two considerations suggest a major change in the role of the FTC. The first is that no agency or combination of agencies continuously appraises the economic performance of American industry (in the sense used in this paper) or the quality of competition. Enforcing existing antitrust law is a much different matter. If an antitrust agency does pay some attention to the subject, the agency is likely to do it in the context of carrying out its antitrust functions rather than for the purpose of understanding and objectively describing what is going on in the industrial world. The second consideration is that information considered sensitive by firms is essential to appraising economic performance and quality of competition, and only an agency with subpoena powers and able to fulfill its mission despite the hostility of industry can obtain the needed data. The suggested role for the FTC, therefore, is to obtain, analyze, and publish, both on a continuing basis and as special studies, data bearing on economic performance and its determinants in major divisions of American industry, food among others.

Much of the data would relate to operating results achieved by firms in narrowly enough defined Standard Industrial Code groupings to be meaningful about such industry branches as meat packing, bread baking, or food retailing. The line-of-business reporting on which FTC is now working is a beginning. Periodic studies would collect data on situations that do not change rapidly over time. Data collection would be integrated with that of other agencies such as the Census Bureau and IRS. Both data useful to others and analyses of performance and its determinants would be intended output from FTC's work.

I would be happy to see FTC's other major functions shifted to other agencies: the antitrust functions to the Department of Justice and activities relating to consumer protection to a new consumer agency. To play the central role in describing, appraising, and explaining the economic performance of the major divisions of American industry is a sufficient task for one agency.

### U.S. Department of Agriculture

The areas in which USDA might make its major contribution to appraising performance in the food industry probably are efficiency, progressiveness, and price coordination, though no agency



should be limited to any particular categories. USDA has technical expertise to study plant efficiency, alternative market channels, economies of vertical coordination, all forms of food price behavior, and similar subjects. Frequently, data for such studies will be available from producers and food firms, as they see opportunities to use the results to make adjustments in their own business operations.

Here I would like to be more specific about the significance of the missions and data-gathering powers of agencies for their roles in appraising industry performance. An agency cannot be all things to all people and is unlikely to be politically viable if it tries. If Congress really wants appraisal of industry performance, it can give funds and directives (and political backing) to agencies whose missions are appropriate for the work. The difficulty faced by USDA in getting sensitive data bearing on performance without jeopardizing its other data collection activities limits its potential role in appraising performance. But USDA can go farther in using data generated by other agencies than it can when it must rely on its own data. Its scope is still broader for economic analysis of the determinants of performance, for which data from many sources may be utilized.

### **Consumer Agency**

A new consumer agency would be useful in appraising and inducing good performance if it assumed and rounded out consumer protection functions now located in other agencies. Such functions include the monitoring of advertising and packaging to prevent deception of consumers, Food and Drug Administration functions, meat inspection, and consumer product safety. Improvement of consumer information about foods would also be part of the agency's missions, and much of the appraisal of performance discussed under the heading of product presentation would fall within the agency's area. To give the agency power to intervene in the exercise of functions assigned to other agencies, however, would be to throw a monkey wrench into the already creaking bureaucratic machinery.

### **Universities**

Economists located in universities and a few other non-governmental organizations will continue to study economic

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structure and behavior as they relate to industry performance. Probably the availability of better data, especially of the kind proposed for FTC, would stimulate university research in the field, for doing research with the gross data now available is like trying to guess the contents of a package by observing its size and shape. University economists emphasize the search for relationships having explanatory and predictive power and, because of their diversity, are likely to generate and examine a wide range of hypotheses derived from differing economic orientations and valuations.

Appointments of university economists to the staff of the FTC (if assigned the role proposed above) for 2 or 3 years would be useful for maintaining a fresh and independent approach by the agency to its work and for expanding university economists' understanding of the real world to which scientific inquiry is supposed to be addressed.

### Special Study Commissions

Dissatisfactions with performance of the food industry build up at times to the point where special study commissions are proposed. The National Commission on Food Marketing of 1964-66 was such a commission, and legislation establishing another is now being considered. The need for special studies would be much less if there existed an ongoing examination of food industry performance and its determinants in the manner already suggested.

Special commissions are likely to be asked, appropriately, to study matters presumed to affect performance as well as performance itself. In light of the difficulty of appraising performance, a short-term commission will be especially inclined to emphasize structure and conduct. The members of any commission likely to be appointed will have attitudes and alliances with which their careers are intertwined and that will influence their conclusions more than will specific findings. Supportable findings may not satisfy vocal, doctrinaire individuals and groups outside the commission who seek confirmation of simplistic views of how the economy works. Thus, the consensus and popular acceptance needed for large direct impact of a special commission's work on policy are likely to be lacking. But it is possible that a concentrated effort will produce new information on the current state of

the industry and how it works, and that the efforts of the commission will be justified by many applications of such knowledge in later years.

### Other Agencies

Federal departments such as the Department of Commerce can also do the kind of work discussed for USDA but are likely to do much less of it. Agencies engaged in the collection of economic data, particularly the Bureau of the Census (a part of Commerce), will continue to produce information essential to, if not sufficient for appraisal of, performance of the food and other industries. The President's Council of Economic Advisers, the Joint Economic Committee of Congress, and some other Congressional committees will draw upon data and findings produced elsewhere and may do some analyses of their own.

Groups such as organized labor, agriculture, industry, and consumers, will also draw on the information discussed here. Their various interpretations will help to assure that issues are examined from many sides. At the same time, better basic data and more incisive analyses than now available might so impair the credibility of some of the wilder views of industry performance now current that the policymaking process would be significantly improved.



I should like to conclude by making several rather disjointed comments to amplify what has already been said about appraising the performance of the food industry and who might do it.

The usefulness of inferences about performance obtained from studying the setting in which firms operate should not be built up to the point where knowledge of structure and conduct is assumed to tell all one needs to know about performance. There are other determinants of performance, and most relationships between structure and conduct on the one hand and performance on the other have low predictive power. Improved understanding of the determinants of performance depends on having independent, not inferred, evaluations of performance.

An idea often implied in discussions of performance but less frequently explicitly stated is the following: keen rivalry among

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firms tends to force production operations toward their socially optimal configurations (in the absence of externalities), but the same is not necessarily true of marketing operations. (Here I use *marketing* in its usual business sense meaning advertising, sales promotion, packaging, and other functions directly related to sales volume, rather than in the everything-that-follows-farming sense.) Excessive marketing costs can arise even when seller concentration is low and products are intrinsically alike. This is an additional reason for not relying upon structure as a proxy for performance.

A fuller understanding of how the food industry operates is necessary for appraisal of performance in ways not so far suggested. Various branches of the industry have modes of behavior that reflect practicable ways of dealing with common problems or business strategies attuned to the special circumstances of the branch of the industry. Often, standard economic theory does not even suggest such institutional elements though they materially affect decisionmaking, pricing, the character of competition, and performance. Two examples are pricing practices of supermarkets and the complex competition between nationally advertised brands and private label products. There appear to be unexploited opportunities to identify such elements, to account for their existence, and to develop some generalizations about their relation to performance.

I have said nothing about Harberger-style analyses of welfare losses resulting from oligopoly in industry: analyses that employ supply and demand functions for an industry and the concepts of producers' and consumers' surpluses to arrive at estimates of net social loss. I regard such analyses as hopelessly naive. The empirical base for demand and marginal cost functions for an industry is usually weak (except that in some instances there are good reasons to suppose that supplies of inputs are perfectly elastic). But the great limitation is that oligopoly may be only an element of a total pattern in which marketing costs are excessive, management and even labor are over-rewarded, distribution methods are inefficient, progressiveness is suppressed, and so on. (Such defects are not *necessarily* associated with oligopoly, but they *may* be.) There are, of course, reasons for poor performance other than oligopoly. To appraise and understand performance, economists must get inside an industry, observe how it operates, employ

several criteria, and base conclusions on empirical data relating to those criteria. The same reasons also help to explain why profit rates alone tell little about performance.

Economists should be more willing to take the bull by the horns and to use specific standards in appraising performance. For example, the public is so thoroughly confused about profits that use of a reasonable rate of return, of the amount suggested earlier, can clarify the state of affairs much more than the element of arbitrariness in the standard obscures it. Advertising costs and feasible cost savings in processing and distribution are other examples. Usually there will be supplementary information of the types already indicated that should be developed before drawing conclusions about the need for corrective measures. Deviations from the standards should be expressed as percentages of sales, prices, value added, and perhaps other measures to make clear their relative importance.

Good performance is a multi-faceted goal, and the question may be asked: how can different scores on different elements of performance be combined to obtain a single measure of total performance? One partial answer is that greater willingness to quantify deviations from standards and to express them as percentages of sales or value added would produce numbers that can be added. Another is that in some instances general ratings can be given because no more than minor faults are found in any respect or because at least one major fault is evident. But probably the best answer is that a single measure of total performance usually is not needed for the main purpose of the study of performance, which is improvement of performance. Appraisal of particular deficiencies ordinarily is sufficient to launch the search for remedies. Only if improvement of one element of performance impairs another is a judgment about trade-offs involved, and then only among the elements involved.

Would it be socially useful to appraise the performance of the food industry—and of other major divisions of industry—in the way I have suggested? Probably it could lead to improvements in performance much exceeding in value the costs of appraisal, though it must be recognized that there is a long step between appraising performance and improving it. Even if little was done to make performance better, however, substantial benefits might result from stronger evidence concerning economic difficulties

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properly attributable to particular industries and distinguishing them from difficulties not correctible on an individual industry basis. When the public is afflicted by inflation, much higher real costs of energy, increased competition from abroad for food supplies, and basic environmental problems, there is a strong bias among the public toward attributing disliked consequences to apparently simple causes with correspondingly simple solutions. Excessive profits, inefficiency, and other aspects of industry performance are high on the list of such supposed causes. Confusion is confounded by opportunists who seize upon dissatisfactions to push their own causes or personal advantage. The potential social loss is that policy will be directed along ineffective and possibly harmful paths while doing nothing about the basic causes of economy-wide problems. I am not at all sure that we shall handle such problems effectively, but I am convinced that better information on industry performance, developed in ways convincing to opinion leaders, is part of the knowledge base needed for successful policy.

### References and Notes

<sup>1</sup> Virtually all of the subjects discussed in this paper have been extensively considered in principle by economists. Empirical work on food industry performance has been sporadic but nevertheless substantial over the years. So much of the vast literature might be cited in this broad-brush treatment that the decision was made to go to the other extreme and to cite none of it. An exception is made, however, for S. H. Sosnick, who has emphasized operational criteria for performance and workable competition (see, particularly, his "Operational Criteria for Evaluating Market Performance," in Paul L. Farris (ed.), *Market Structure Research, Theory and Practice in Agricultural Economics*. Ames: Iowa State Univ. Press, 1964).

<sup>2</sup> Some critics of food industry performance hold that the profit motive is the root cause of presumed excessive prices to consumers. This hypothesis can be tested in part by comparing the performance of consumer and farmer cooperatives with that of private firms and by determining why retail food cooperatives are so unimportant in the industry.

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# BAE-ERS Alumni Day

September 24, 1976

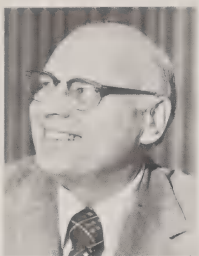
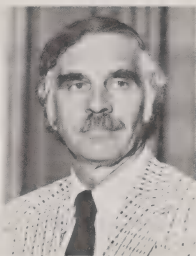
A special feature of the ERS Bicentennial Year Lecture Series was a unique BAE-ERS Alumni Day, featuring discussions by current and former directors of agricultural economics and administrators. BAE, the Bureau of Agricultural Economics, is the forerunner agency of ERS.

Special guest panelists at the reunion session were *Don Paarlberg*, then Director of Agricultural Economics; *O. V. Wells*, BAE Chief from 1946 to 1953; *Willard W. Cochrane*, Director of Agricultural Economics from 1961 to 1964; *Nathan Koffsky*, 1961-65 ERS Administrator and Director of Agricultural Economics from 1965 to 1966; *John Schnittker*, Director of Agricultural Economics in 1965 and Under Secretary of Agriculture from 1965 to 1969; *M. L. Upchurch*, ERS Administrator from 1965 to 1971; and *Walter W. Wilcox*, Director of Agricultural Economics from 1967 to 1969.

Presentations by Drs. Cochrane, Upchurch, Wells, Wilcox, and Koffsky are reproduced here. The following remarks by Dr. Paarlberg, while presented at another seminar, are definitely to the point of the lecture series. We therefore take the liberty, with Dr. Paarlberg's permission, of including those remarks.



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**BAE-ERS Alumni Session***Don Paarlberg**O. V. Wells**Willard W. Cochrane**Nathan Koffsky**John Schnittker**M. L. Upchurch**Walter W. Wilcox*



## DON PAARLBERG

A friend recently asked me a very searching question: "what is the most important thing that has happened in agriculture during the past 8 years?"

I stalled him off at the time. After a month's reflection, I gave him this answer: "the most important thing that has happened is that agriculture is losing its uniqueness."

The answer left him perplexed; perhaps you are equally puzzled. I'll try to explain.

Agriculture was once unique and different, favorably distinguished from all other forms of livelihood. This was true economically, culturally, and politically.

When our Nation was founded, farming was a way of life, not truly a commercial enterprise. Farm and household were combined, almost inseparable. Farming was basic. If someone left agriculture, the essential thing about him, whatever he did, was that he became a nonfarmer. Farmers produced the new wealth; manufacturers and merchants merely elaborated and redistributed that wealth. Farmers made good citizens and good soldiers. They were free, independent, and self-reliant. They constituted the great majority of the population, more than 90 percent in colonial times. They were readily distinguishable from the rest of the population by appearance, speech, and manner. They were considered the proper custodians of political power.

So the division of the population into farm and nonfarm categories made a lot of sense. There developed a body of rhetoric and a set of institutions that supported and reinforced the farm-nonfarm delineation. The rhetoric took a form which came to be known as *agricultural fundamentalism*. Its chief proponent in this country was Thomas Jefferson.

The image and the ideal for agriculture, in summary, were:

- Family farms in great numbers, owned by the men who operated them, producing a large and growing volume of crops and livestock.

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Note: These remarks, entitled "Agriculture is Losing Its Uniqueness," were presented by Dr. Paarlberg at a Dec. 8, 1976, meeting of the Washington Chapter, American Association of Agricultural College Editors.

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- Farm operators who were sturdy and self-reliant, making their own decisions, turning their farms over to their sons upon retirement, enjoying the satisfaction that comes from an honorable occupation, experiencing a rising standard of living, and feeling the prestige that results from land ownership.

There was no other vocation of which similar things could be said. It was a mighty vision, never wholly true but true enough to justify it as an ideal.

These ideas readily took hold in a country with a growing population, a vast expanse of fertile unused land, and a new government intent on opportunity for the common man. Farmers didn't have to be taught these things; they felt them in their bones. Agriculture was unique.

The institutions that developed reflected this uniqueness. We set up a separate Department of Agriculture. We passed the Homestead Act. When labor legislation was enacted, there were exceptions for agriculture, because agriculture was unique. Likewise for social security.

We developed parity programs for farmers but not for anyone else. The land-grant colleges were set up as unique institutions, to serve a unique constituency. We insisted that the uniqueness applied even to the scientific disciplines. There were chemistry and engineering, economics, and statistics. Agricultural pieces of these disciplines were pried off and taught in a school of agriculture.

So we had a good, tight delineation, farm and nonfarm, reinforced by a body of rhetoric and supported by a set of institutions. The whole thing seemed logical and immutable. And it worked. With this set of ideas and institutions we settled the West, increased the food supply, and gave status to our farm people.

Of course, there was some good-natured joshing about the farmer. Usually the cartoonist pictured him with a pitchfork and a straw hat. He occasionally came to the Big City and someone sold him the Brooklyn Bridge. Usually he had a daughter who had various adventures with traveling salesmen. But in the folktales of the day, the farmer generally got the best of the city slicker, and we all got a glow of satisfaction out of it. The farmer was unique, and worthily so.

Then came the scientist, the technologist, the engineer, the businessman, and the educator. There came the tractor, the automobile, the experiment station, the extension service, and the agricultural college. There came rural free delivery, rural electrification, paved roads, the consolidated school, and central markets. There came the radio, the telephone, and television and the farm press. There came the management people, who broke apart the factors of production as they had long existed on the family farm—land, labor, capital, and management in the hands on one person—and recombined them in optimum fashion, so that organizationally, farms began to look like other business enterprises. Farmers began to rent land, hire labor, and borrow capital. Farms were incorporated. The farm business began to separate itself from the household. The farmer bought his fuel and fertilizer rather than producing his own. His wife bought her groceries at the supermarket, as did other people, and perhaps took a job in town to add to family income. The farm population declined, and is now approximately 4 percent of the total. It became first a minority of the total and then a minority of the rural population, where farmers are now outnumbered about five to one. Things are now at such a pass that the net income of farmers from farming is only about half of the income of farm people. The balance comes from off-farm earnings of the farm family.

Whereas formerly farm people were readily distinguishable to the eye and to the ear, they are no longer. The farm audiences that I meet would be hard to tell from an audience of hardware merchants. Farm income per person, formerly far below the non-farm figure, is inching toward equivalence.

Thus, the farm-nonfarm delineation is being blurred. The city limits sign, formerly a cultural and economic barrier, is becoming merely a line marking the difference between units of local government.

No doubt about it, agriculture is losing its uniqueness. Apart from historic reasons, it makes approximately as much sense today to divide the population into farm and nonfarm categories as it would to divide us into businessmen and nonbusinessmen, teachers and nonteachers, barbers and nonbarbers.

When agriculture loses its uniqueness, what happens to the unique institutions that were set up to serve it? And what happens

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to the rhetoric that eulogized this once unique form of livelihood? That is the subject of these reflections.

The scientists and the technologists are the unintended architects of economic, social, and political change. There is a principle which declares that when technical change occurs, institutional changes must in time take place. The old rhetoric will be repeated long after the change has occurred. The order of change is as follows: first the fact, then the deed, finally the word.

We see this in agriculture. Technical change has occurred and is by no means complete. Institutional accommodations are being made, reluctantly and painfully. But out in the country, the rhetoric of agricultural fundamentalism is still being voiced.

These last 8 years have witnessed the delayed impact of technical change on our agricultural institutions. The effect has been profound. I list the following evidence:

1. Farmers are deporting themselves, in their business decisions, more like nonfarm people than like the farmers of former time.

2. The former white male tradition that long characterized agriculture is being eroded. And the old idea that a farmer should live poor so as to die rich is gradually changing. Fewer farmers now aspire to be the richest man in the cemetery.

3. The agricultural establishment has lost control of the farm policy agenda. The major issues of agricultural policy these past 8 years have been the ecology, consumer concerns, food supplies, and the like, questions placed on the agenda by nonfarm people. Agriculture's legislated uniqueness has come tumbling down: commodity programs, land use, water rights, provisions regarding hired farm labor.

4. The constituency of the Department of Agriculture has changed. Only 16 percent of our 1977 budget was in the form of research, education, and other services devoted to our historic farm clientele. The balance was for food stamps, lending programs, natural resources, environmental services, and other new agenda items.

5. On policy issues in the field of food and agriculture, the Department of Agriculture is no longer clearly decisive within the Executive Branch. The Departments of State and Treasury, the Office of Management and Budget, and the Council of Economic Advisers take on larger responsibility.

6. The land-grant colleges, no longer sure of the uniqueness of

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**"An accumulation of institutional changes, piled up behind an obstacle of social inertia, has finally broken loose."**

their role, are broadening their services to encompass the rural nonfarm sector and, indeed, the urban groups.

7. The farm organizations, operating from a base of declining power, are working with nonfarm groups through a series of alliances and coalitions.

8. The agricultural committees of the Congress are balancing their membership and their legislation, showing a new awareness of such nonfarm concerns as food stamps and environmental protection.

The rhetoric is changing too, though the change comes slowly. It would not be possible today, as it was 25 years ago, for Carl Wilkin to get an attentive hearing for his contention that a dollar generated in agriculture would multiply itself seven times as it moved through the economy.

But agricultural fundamentalism still sounds good in the rural areas. Though robbed of much of its meaning, it still has the power to move an audience. If a person listens to the rhetoric and generalizes from it, he can drift totally out of touch with the true situation.

If I had to name one perception that best explains the farm policy issues of these turbulent times, it would be that agriculture is losing its uniqueness. It is entering the mainstream of economic life. Ultimately the institutions and the rhetoric must take into account this overriding fact. We are experiencing the creaks and groans that accompany this adjustment. An accumulation of institutional changes, piled up behind an obstacle of social inertia, has finally broken loose.

The changes occur in much the same fashion as atomic radiation. What is the half life of agriculture's uniqueness? Maybe 30 years. Maybe commitment to the old order halves itself each generation. It will be a long time before it disappears altogether.

These changes have both pluses and minuses. On the one hand we remove, both directly and indirectly, the disadvantages of income, opportunity, and social services that farm people once felt. At the same time we set in motion forces that deprive farmers of a sense of unique worthiness and push them toward becoming an undifferentiated part of a homogenized society. How do I react, watching and participating in these changes? We are near the end of an era. I raise a cheer, a rather weak cheer, not two. Certainly not three.

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But what difference does it make whether we raise one cheer or two or three—or none at all? The change is underway and it is irreversible. Turning it around would be about as likely a prospect as putting the chicken back in the egg.

### WALTER W. WILCOX

I could use all the time available to me just recounting my many pleasant experiences during my 2 years as Director of Agricultural Economics. Rather, I will try to respond briefly to the invitation to comment on current and emerging problems encountered by ERS.

I am impressed by the great change in the relevant issues in 1976 as compared with those that were dominant in 1967 and 1968. The single greatest difference is the increased importance today of accurate, timely information on world food supplies and prices.

Farmers, agribusinessmen, and consumers continue to be vitally interested in the latest available data on U.S. crop production, livestock marketing, stocks, and prices. But they now are asking for comparable information on supplies and prices elsewhere in the world. They have learned that sharp changes in export demand are fully as important as changes in crop yields in influencing domestic markets.

I am aware of the recent ERS reorganization for the purpose of responding more effectively to these new demands. Progress has been made in providing more data and more analysis of data from foreign countries.

In my judgment, however, there is widespread demand for even more analysis and especially more timely data from foreign countries. The users of the data provided by SRS (Statistical Reporting Service) and ERS, in my opinion, are eager to obtain the latest information on foreign supplies and prices at the same time that major reports are released on domestic supplies and prices.

The Office of Technology Assessment, where I have been employed as a consultant for several months, made a study of nutrition, food, and agriculture information systems which

resulted in several days of hearings by the Technology Assessment Board.

At these hearings and in papers prepared for OTA, a number of suggestions were made for restructuring ERS and FAS (Foreign Agricultural Service) to provide more timely information on the world food situation. A proposal endorsed by several witnesses was the creation of a World Crop Reporting Board in USDA with responsibility for reviewing all national and international information. It should issue reports on a regular schedule, announced in advance, which would be recognized as authoritative throughout the Government.

Those not familiar with the proposals for reorganization developed at the Technology Assessment Board hearings may wish to get a copy of the OTA report OTA-F-35, *Food Information Systems, Summary and Analysis*, issued in August 1976.

I have noted with interest that, following the embarrassing inaccuracies of its price forecasts in 1973, ERS has placed a great deal of emphasis on the development of more sophisticated models. I have heard much more about new model development than about improvement in the timeliness and accuracy of data.

Quite frankly, I am concerned that not enough time and effort is going into improving the data base for economic models. I also am concerned that too great reliance may be placed on these sophisticated models and not enough effort will be made to develop and maintain professional competence to evaluate new market-influencing developments that cannot be incorporated in a model.

## O. V. WELLS

The invitation to this seminar allows each of us to start almost anywhere we please, so I have chosen a subject directly related to the tasks of managing the work flow and maintaining the necessary funds for agricultural economics activities. These are two inter-related problems to which the senior officer or officers in charge of economic work must devote a large amount of attention whether they like it or not.



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More precisely, I want to talk for the few minutes allotted me about professionalism, about the professional attributes and problems of agricultural economists and their associates, including training, peer relations, who their clients are, and what their products may be. I shall suggest that agricultural economists as a group have many of the characteristics of an officers corps, including, of course, the emphasis on both basic and advanced training; the fact that most of us are employed in public service; and the fact that as one moves toward the top, he often finds himself working within certain limits or general policies which are set not by himself and his fellow professionals but rather by the senior political officers of his government.

The best short discussion of professionalism with which I am acquainted is the introduction to Millett's study of the development and career of a typical army officer.<sup>1</sup> Let me summarize the heart of the Millett arguments in his own words:

"A profession is an occupation more 'professionalized' than other occupations, that is, it is assuming attributes typical of all professions.

"While there may be no consensus about the exact number and character of these attributes, they include the following:

"(1) the occupation is a full time and stable job, serving continuous societal needs;

"(2) it is regarded as a life-long calling by the practitioners, who identify themselves personally with their job subculture;

"(3) the occupation is organized for the control of performance standards and recruitment (and requires formal, theoretical education);

"(4) the occupation has a service orientation in which loyalty to standards of competence and loyalty to clients' needs are paramount;

"(5) the occupation is tacitly granted a great deal of autonomy by the society it serves, presumably because the practitioners have proven their trustworthiness."

In short, the professions are characterized by the accumulation and systematic exploitation of specialized knowledge along with the fact that "the professional asks that he, and not his client, set the conditions under which his knowledge and skill are to be utilized." Further, "in Twentieth century America, professionals have progressively plied their skills within the organizational context of



business corporations, governmental agencies, and other complex institutions like universities (and research centers). The result is that occupations have often become professional at the same time they have been bureaucratized."

I assume that agricultural economists generally will easily recognize the extent to which the above attributes or characteristics apply to them and their colleagues. And I assume also that a little reflection will indicate the stresses and strains which are inherent in such methods of operation—stress and strain which not only condition the activities of the aspiring individuals in an intensely competitive profession but which also create a series of actual or potential conflicts that must somehow be avoided or resolved by the profession's leadership group.

But before going into these problems, let us first consider a few statistics. Fortunately, we now have the recent note by Anne Peck and Emerson Babb on the education, employment, and mobility patterns of the AAFA membership.<sup>2</sup> The base for this analysis is the membership data included in the Association's 1972 Handbook which, excluding student members and incomplete returns, covers 2,075 regular AAFA members.

We are warned that this "is a biased sample, representing mostly individuals who have obtained advanced degrees. Thus, the analyses should be extrapolated to the profession at large with a great deal of caution." Perhaps so, but it clearly emphasizes the professionalism of the tribe. Of the 2,075, there were 5 with no college degree, 72 who only had a B.S., 452 whose training stopped with a M.S., and 1,456 with a Ph.D. That is, some 96 percent of those covered held an advanced degree, nearly three-quarters a Ph.D. As for employment, 65 percent were academics and 24 percent were in government employment.

We are told that the best check data available is the American Science Manpower survey sponsored by the National Science Foundation. For the agricultural economics group, this survey provides data for 1,501 individuals (after eliminating those who claimed international trade, economic development, and econometrics as their special field). The attempt was to secure as broad a coverage as possible but the results are much the same as those from the AAFA list. That is, the NSF shows 91.5 percent of the agricultural economists with an advanced degree, but only 57.5 percent with a Ph.D. It also shows 55.5 percent as academics

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and 30 percent employed in government.

Within the Ph.D. classification, the AAEA data show 73.4 percent employed as academics in 1971, 5.7 percent in business, and 19.1 percent in government. The comparable data from the NSF show 72.5 percent of the Ph.D.'s as academics in 1970, 2.9 percent in business, and 19.5 percent in government.

Peck and Babb also analyze the AAEA data in terms of mobility patterns as far as the data will permit. They of course find considerable shifting of employment but almost all of this is between the several colleges and universities and between the universities and government, with 66 percent of those in business and 85 percent of those with foundations having had previous experience with either the colleges or the government.

The problems which agricultural economists face are much the same wherever they may be employed, although I am best acquainted and most concerned with problems facing those working in the Federal Government.

There is first of all the problem of identifying one's client or clients, which also requires a clear realization of what services or products one has to offer. And these inter-related problems of clients and services are of special concern to the administrators and directors who are held responsible for somehow finding and maintaining the funding without which public service activities cannot be performed. They may also on occasion find some of their colleagues as well as some outside critics who seem to feel that their institution is itself their client. This they cannot accept.

Agricultural economists serve many clients—farmers, farm organizations, agribusiness, consumers, and political interests. But agricultural economists, along with many other professional groups, also have an over-riding commitment to what we may call the public interest. That is, they want their activities to contribute to the public welfare.

This does not mean, however, that agricultural economists are not highly competitive. They are. But they are keenly aware of and as a rule responsive to the ideas and judgments of their peers, their fellow economists. So their competition is channeled mainly along professional lines with their frictions and arguments centering around disputes over theoretical principles, analytical techniques, institutional missions, organizational problems, ethics, and standards of competence. Each economist must learn to somehow

**“...donkey work—that is, work which is in large part routine but which their clients demand as a price for maintaining the profession.”**

cope with these conflicts as well as the fact that he must always be wary of any direct political commitment.

Products which agricultural economists have to offer vary from time to time and much of the work which they have to do must seem to many of them to be donkey work—that is, work which is in large part routine but which their clients demand as a price for maintaining the profession. The academics, for example, must carry a relatively heavy teaching or extension load even though many of them would prefer to be research professors while the governmental group must always supply a large mass of statistical fact and repetitive analyses even though many of them feel that their real function should be to supply policy advice.

Over the years that I was with the Department (1929-61), my standard argument was that the best contribution that we could make was to see that the several farm groups, the agribusiness and consumer interests, the action agencies and their administrators, the White House advisers (including the Council of Economic Advisers and the Budget Bureau), and the Congressional leaders and committees all started their arguments from the same basic facts and analyses. I assume that this is still a guiding principle within the Department.

The difficulty is that this not only calls for a great amount of detailed work but also for a considerable ingenuity in the field of public relations. It is not always such a simple matter to tell the Farm Bureau the same as one tells the Farmers Union, to supply your Secretary and the White House advisers with the same material as goes to the Congressmen (whether they be Republican or Democrat). Both your facts and your analyses must be able to stand up under continuous questioning. But to the extent that there is agreement at the factual and analytical level the greater the chance for a reasonable solution of the policy problems and if you and your colleagues are around to supply the factual material the greater the chance that your advice on policy matters will be asked. Or so I believed.

Almost without exception, the administrators of economic research in the Department have been selected on the basis of their professional competence. At the same time, however, they must also serve as administrators, preside over the service functions of their group, and carry the main burden of the never-ending budget and appropriations fight. They have their identity

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problems and some of them have surely felt that their policy views were not given due weight at the political level. A reading of the article by Rasmussen and Baker or the Kirkendall study indicates clearly that the difficulties experienced in the BAE during the thirties and forties were due to this basic conflict.<sup>3</sup>

With the reorganization of the economic research and statistical activities of the Department, an effort was made to at least minimize this problem by providing for professional administrators for both agricultural economic research and agricultural statistics and who clearly should not be asked to carry political arguments. These career administrators, in turn, report to the Secretary of Agriculture through a Director of Agricultural Economics. This assistant is clearly expected to help advise the Secretary and once a political decision is reached to help support it.

Agricultural economists have done very well over the years. There have been difficulties; but an agricultural economist has served as Secretary of Agriculture for 22 out of the last 44 years and the tribe has contributed deans and directors galore to the colleges and universities over the same period. What I have tried to emphasize is the professionalism that characterizes the group as a whole and to point out some of the stresses and strains that go with this. Professionals have difficult tasks to perform, tasks which for one reason or another are beyond the competence of their clients. And the frustrations and anxieties come when the professionals and their public have different conceptions of what their work really is or should be. This a fact that needs to be better understood.

## References and Notes

<sup>1</sup> Allan R. Millett, *The General*. Westport, Conn. and London: Greenwood Press, 1975.

<sup>2</sup> Anne E. Peck and Emerson M. Babb, "The AAEA Membership: Employment and Mobility Patterns," *Am. J. Agr. Econ.* Vol. 58, No. 3, Aug. 1976.

<sup>3</sup> Gladys L. Baker and Wayne D. Rasmussen, "Economic Research in the Department of Agriculture: A Historical Perspective," *Agr. Econ. Review*, Vol. 27, Nos. 3 and 4, July-Oct. 1975, and Richard S. Kirkendall, *Social Scientists and Farm Policies in the Age of Roosevelt*. Univ. Missouri Press, 1966.

## WILLARD W. COCHRANE

There is much talk and considerable speculation these days about the need for more effective policy planning and coordination both in USDA and throughout the Federal Government. Without doubt the need is real. And there is some possibility that the need will be satisfied in one way or another. But I want to argue as vigorously as I can that ERS should not become that planning agency in USDA. ERS can and should serve as a resource base for planning activities in the USDA. But it should not become *the* planning agency.

This is the case because planning work in a Federal agency must relate to and give substantive content to the policy views of the chief political officer of the agency. Policy planning is inextricably tied up with political goals. Thus, USDA policy planning and coordination should be undertaken in the Office of the Secretary of Agriculture, and the planning staff must be prepared to change when the Secretary of Agriculture changes, and the political goals of the USDA change.

This kind of change and upheaval in the professional staff of ERS we, of course, do not want to occur in ERS every time the administration changes. We want a strong, permanent professional staff in ERS with the capacity to carry out its basic mission.

The basic mission of ERS is to serve as the economic staff agency to three sets of constituents: (1) the Office of the Secretary, (2) the Congress, and (3) the national agricultural economy. Serving as the economic staff agency to these three constituencies means providing economic intelligence and analysis that serves the needs of each of those three constituencies. The work of economic intelligence involves the gathering in of all available information, statistical and otherwise, refining it, and presenting it to the users in a form which is understandable and helpful to them. The work of economic analysis involves the identification of important variables in the operating agricultural economy, establishing relationships among those variables, measuring those relationships, and explaining and interpreting the operation of the agricultural economy in terms of those variables so that each of the constituencies can better understand the operating economy

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and make rational decisions with respect to it.

ERS serves as an economic staff agency to three distinct and disparate groups. For each it must do intelligence work and analytical work; in this sense the work of ERS will be homogeneous and internally consistent. But the interests and informational needs of the three groups which ERS serves as a staff agency are very different. This ERS must recognize in its staff, organization, and information activities, and provide each of the three constituencies with the kind of intelligence and analytical work that each demands and requires. This, of course, is not easy to do. It means that the leadership of ERS must spend much time ascertaining the intelligence and analytical needs of each constituency. It must then develop organizational systems within ERS that can deliver the relevant intelligence and analyses to each constituency in the form and at the time that each is needed.

I should like to make one final point with regard to the work of ERS that is poorly understood, and on which there is sometimes hot debate. I have argued that the basic mission of ERS is to provide economic intelligence and analysis to three different constituencies; as such it operates as a staff agency. It should be recognized that, as a staff agency, its primary goals are not and should not be the training of professional personnel and the creation of new knowledge. Obviously, in its staff agency role, professional staff members will learn new techniques and improve their professional skills, and new ideas and analytical techniques will emerge. They cannot help but do so if the staff work of the agency is innovative and developing. But the primary role, the basic role, of ERS is to *service* the economic intelligence needs and the analytical needs of three constituencies. This means then that the basic role of ERS in the USDA is different from the role played by departments of agricultural economics in the various universities. The basic role of the universities is to train professional workers and to create new knowledge through research. A logical division of labor thus emerges between the work of ERS and the work of the departments of agricultural economics in the various universities. The work of the two different kinds of professional agricultural economic agencies will sometimes overlap; but that should not worry us unduly. What should worry us is, if ERS should tend to forget its basic staff function and start behaving like a department of agricultural economics in a univer-



sity. If and when ERS ceases to properly and effectively service its three principal constituencies, it will wither away and die.

### M. L. UPCHURCH

This particular session gives you a chance to see what former administrators of agricultural economics in USDA look like and for us to see that our participation in years past was only a prelude to the important work that lies ahead. None of us is immortal, none irreplaceable, but the task of providing economic intelligence for American agriculture and for government operations is irreplaceable. As Thoreau once said, if you kick economics out the door, it will creep back in the window. If USDA did not have an ERS, it would have to invent one. Thus, you, as a whole, play a more vital role than perhaps you realize and certainly more vital than you often get credit for.

The occasion for this session is our Nation's 200th birthday although the organized work in agricultural economics in USDA barely exceeds a fourth of that period. It is hard for me to realize that the professional life of some people in this room spans almost the entire history of the discipline. Considering the current stature of ERS and the current sophistication of agricultural economics, I am reminded anew of the huge debt we all owe to such pioneers as H. C. Taylor, L. C. Gray, O. C. Stine, Fred Waugh, Carl Taylor, H. R. Tolley, and dozens of others. These men set standards of public service and professional excellence that have characterized the work in agricultural economics since its inception. Their model remains worthy of emulation.

ERS and its predecessors have a venerable history of accomplishment in USDA. Its immediate influence on government policy has varied from time to time, depending largely on the personalities in the Office of the Secretary, but its integrity in developing and publishing economic intelligence for agriculture has always been unassailable. I am sure it will remain so.

But the accomplishments of BAE/ERS have not been equally laudable in all areas. Its greatest strength has been and remains in the area of commercial agriculture. The demands for attention

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have been loudest from commercial agriculture and the support from the Congress has been greatest for this phase of the work. Thus you cannot blame ERS administrators and ERS personnel for concentrating on phases of the work most wanted by the Secretary, by OMB, and by the Congress even when it means relative neglect for other phases of work.

To be more specific, I think we have failed over the years to give sufficient attention to the socioeconomic problems of rural people and rural areas. There may be a number of reasons for this. One just mentioned is that support for this work has been less than overwhelming. Other reasons might lie within ourselves. Getting information about and doing research on the problems of rural poverty have been more difficult than working with commercial agriculture. The problems take us beyond the comfortable boundaries of our discipline. You normally do not solve the problems of rural poverty within agriculture, or at least not within agriculture alone. Thus, we have had to look beyond the traditional boundaries of farm management, marketing, and land economics and most of us are not well equipped to do this.

One aspect of this relative neglect of rural poverty problems may lie in the difficulties with data. For example, the Census of Agriculture at best, has given us only a little information about farmers and farm families. It never has given us information about the people who work for wages in agriculture or about rural people in general. The Census of Population is a bit better, but it comes only every 10 years and the information is sparse at best. This may be improved in the future with a mid-decade census recently authorized by Congress. The Current Population Survey (CPS) is almost useless for socioeconomic data in rural areas other than as a basis for estimating changes in numbers. It is not surprising that we still know more about pigs than about people in rural areas.

This relative neglect of rural people problems cries for correction. It has a number of implications, some that I was not aware of until recently. One, for example, is that rural counties are increasingly disadvantaged in participation in socioeconomic programs designed to help the poor. This comes partly from the fact that many rural counties do not have and cannot afford experts in grantmanship so they simply are not at the table when the turkey is passed. It comes partly from the fact that Federal



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“...we have neglected the socioeconomic problems of rural people.”

and State agencies commonly use estimates of unemployment as one criterion for dispensing program benefits and these estimates are woefully inadequate for rural counties. The estimates simply do not include large numbers of people in rural areas who drop out of the labor force when jobs are not available and they do not include the vast amount of underemployment common to the poor rural areas. Thus the official data on unemployment give a distorted picture of reality and lead to a distorted distribution of social programs.

I am sure that many people here would agree that we have neglected the socioeconomic problems of rural people both within USDA and within the State experiment station system. Certainly others agree as evidenced by such publications as *Hard Tomatoes, Hard Times*.<sup>1</sup> But, what do we do about it? I confess I do not know. One thing we do not do is to neglect our responsibilities to commercial agriculture in order to shift resources to the rural people problems. Congress would not let you do this and, besides, much important work with the agricultural industry is sparsely supported at best. While the Rural Development Act of 1972 offered great hope, so far the support to USDA and to the land-grant institutions under this act has been minimal.

Perhaps the hope lies in a new administration that will have both empathy and understanding of the problems of rural people. I challenge future administrators of ERS to redouble their efforts to get support for such work.

### References and Notes

- <sup>1</sup> Jim Hightower, *Hard Tomatoes, Hard Times: A Report of the Agribusiness Accountability Project on the Failure of America's Land-Grant College Complex*. Cambridge, Mass.: Schenkman Publ. Co., 1973.

### NATHAN M. KOFFSKY

The traditional role of economics research in USDA, going back more than half a century, has been to identify the emerging

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issues affecting American agriculture and to set out for policymakers the options they have to deal with them. During most of my years in the Department, farm policy was largely framed by domestic considerations. But since the early 1960's developments outside the bounds of the United States have received increasing attention in formulating food and agriculture policy, and in my view are likely to dominate policy considerations in the future.

I refer particularly to the long-term critical food problem facing the developing world. This has come to prominence in international forums, partly as a result of analytical spade work by ERS. True, the developing world managed to eke through the food shortages of 1974 with the help of increased imports and larger amounts of food aid, primarily from the United States. Also true, good weather and good harvests in the last 2 years have alleviated the situation in many countries which suffered the most. But as it has in the past, good weather will undoubtedly give way to bad weather, and again the food crisis will rear up.

The underlying disturbing trends remain: high population growth rates and lagging food production. Thus, the projections are that food import needs in developing countries will more than double by 1985 if things go on as they have, on top of a doubling between 1970 and 1974. Half of the food deficit by 1985—about 50 million tons of grain—is likely to be incurred in the low-income countries of South Asia and Sub-Sahara Africa where 1½ billion people will be living. Being poor countries, they do not have appreciable means to import commercially. Being poor, they have the mass of underfed and malnourished of the world and cannot risk reducing consumption further from levels already grossly inadequate. This is the heart of the world food problem.

The consensus of the U.N. World Food Conference correctly concluded that the primary way to approach the problem in the next 10 years was to accelerate food production in the poor food deficit countries, recognizing that measures to limit population growth, while critical over the longer run, would have little impact by then. There has been a considerable response by the international community in mobilizing financial resources for agricultural development in these countries and in building up food aid commitments to approach 10 million tons of grain annually until these countries come close to self-sufficiency.

But to come to such a position of near self-sufficiency within a

decade for these countries would require almost a doubling of the rate of food production increases, from a little more than 2 percent a year to about 4 percent. Considering the long gestation period involved in agricultural development projects which, even with the best intentions of donors and recipients, may run 5-10 years before production is realized and even longer for major irrigation projects, there is little possibility, if at all, that many of these countries will become self-supporting in that time.

This brings me to the point of my comment. The international community may face food aid needs of these low-income countries in the next decade substantially in excess of the 10 million tons targeted by the United Nations. The United States has a special responsibility since it is the world leader in food and agriculture. Two-thirds of world grain exports originate here and the United States currently provides about that proportion of total food aid. (I should mention also that much of our food aid in the past has not gone to the neediest countries but rather to those of political convenience.) Unless the United States takes hold of this matter, nothing will move and prospects will be even more desperate for these people.

Compassion is a difficult variable for economists to handle in calculating the costs and benefits involved in feeding people. But it is not entirely new to ERS, as witness the work of Fred Waugh in formulating the basis for the food stamp plan many years ago. Now the challenge is in the international sphere.



# **World Food Problems and U.S. Agriculture**

**D. Gale Johnson**

**Lecture 6  
October 8, 1976**

The period since mid-1972 has been an exciting one for the observer of world agriculture. It has been a long time since so many changes have been witnessed in so brief a period of time. Prices in international markets rose rapidly and many fell just as rapidly. Both volume and value of agricultural products moving in world trade have increased remarkably. There were anticipations that tens of millions of persons in the low-income countries would succumb to famine in 1973, 1974, and 1975. Fortunately, such anticipations turned out to be largely erroneous and the hardships that did occur resulted primarily from causes other than inadequate food supplies in the world. These were the traditional primary causes of famine: war or revolution, inadequate communication and transportation, governmental bungling, or governmental policies.

During these years, some said the world was faced with a permanent period of food stringencies and much higher prices. It was these voices that were most often found reflected in the electronic and print media. Those who argued that the high prices of 1973 and 1974 were an aberration were largely ignored. While I was among those who believed that the recent events represented an

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aberration and that there had not been a fundamental change in the long-run, supply-demand relationships for agriculture in the world as a whole or in the developing countries, I believe now, as I have for many years, that there are many important, significant, and serious world food problems that are not being adequately addressed and are not likely to be adequately addressed in the years ahead.

One might have expected that, with the attention given to the food difficulties of the low-income countries of the past few years and the wild price gyrations affecting international markets for agricultural products, some new and feasible initiatives would have been started during these years. To the best of my knowledge this is not the case. If a concatenation of events similar to those of 1972-74 should occur again within the next decade, the probability of a similar scenario being played out is very high. Still remaining are the basic national and international policies that permitted very modest deviations below trend in world food supplies during those years to result in food stringencies for the developing countries and high and unstable international prices.

I do not see that the interest and attention given to food problems in recent years have resulted in any new efforts to more adequately exploit the potentialities for increasing the rate of growth of food production in the developing countries. On the latter point, I do not want to be overly pessimistic. The World Bank has finally discovered agriculture; the Canadians, through the International Development Research Centre, can provide us and other nations with one model for economic and technical assistance for increasing rural economic growth; and the international agricultural research centers now seem to have found their place in the hearts, minds, and exchequers of several funding agencies.

My primary objective today is to discuss the future and the interrelationships between some of the important world food problems and U.S. agriculture. Certainly every one listening to this talk recognizes that the future economic health and size of U.S. agriculture is now inextricably bound up with what occurs with food and fiber supply and demand in the rest of the world. While saying that we export the output of 30 percent of our cropland may slightly exaggerate the importance of international trade to American agriculture, it does not do so by very much.

My remarks shall be divided into three somewhat related parts.

In the first I shall give an impressionistic appraisal of the prospects for improvements in the per capita food supplies of the developing countries, and what I consider to be the major barriers to realization of the potentialities that exist. In the second part I shall emphasize a potential difficulty that I believe the United States may face in effectively mobilizing its enormous resources for assisting the developing countries to expand their food supplies. Finally, I shall present what I believe to be an appropriate rationale for food aid, and a proposal for using food aid as a means for minimizing risks for the people of the developing countries.

### **Per Capita Food Supplies, Developing Countries**

Several projections have been made of total and per capita grain production in the developing market economies for 1985. I



*D. Gale Johnson*

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am not going to impose another one upon you since I belong to an underprivileged group and I don't own even one quantitative projection, let alone a whole set. Admittedly, some of the production projections are relatively inexpensive since they represent nothing more than the extension of past trends. And so I could have one if I really wanted one; even the limited resources of a private university would permit such an exercise. But such trend projections, while useful in giving warning signals, tell us all too little.

In a broad sense, the various projections of cereal demand indicate that in the developing market economies total demand will increase at approximately 3.2 to 3.6 percent annually while, if past production trends and/or past policies continue, cereal production will grow at rates of approximately 2.6 to 3.0 percent annually. Over a 15-year period for which these rates are compounded, a seemingly small difference between the growth rates for demand and production lead to a very large quantitative deficit. The grain projections presented at the World Food Conference had demand growing at 3.3 percent and production at 2.6 percent. By 1985, the grain deficit for all developing market economies would increase by 69 million metric tons over the average deficit (net imports) for 1969-71. But compound interest is a wonderful phenomenon; even more shocking deficits could have been obtained by extending the period for a further 10 or 15 years. To carry further the exercise, it can be noted that if the production growth rate for cereals could be increased from 2.6 to 2.9 percent, the increase in the deficit could be cut by 35 million tons.

I should hasten to add that I find more comfort in the ERS projections of grain supply and demand for the developing market economies for 1985 than I do in any of the other projections with which I am familiar. ERS, in contrast to others, has heard that prices can affect both the quantity supplied and the quantity demanded. ERS also recognizes that there may be some relationship between the rate of growth of food production and of food demand. While more equations are not obviously better than fewer, it seems to me that the ERS approach of presenting alternative and plausible scenarios is far superior to a single-point estimate, regardless of how much qualification there is to the latter.

But I do not wish to stress projections. I believe that even a cursory examination of the available information indicates that



**"I can see no resource or biological reasons why grain yields in developing countries cannot reach and surpass yields now obtained in industrial countries."**

significant effort will be required if production growth rates are to more nearly match the growth in demand. From the standpoint of the developing countries, it is highly unlikely that, over a period as long as 15 years, demand will grow at a rate substantially above the growth of output. The difference, which would have to be made up by imports, simply cannot be met at the levels implied by the trend projections of production. This is not because supplies would not be available in the rest of the world, but simply because there would be no mechanism by which the developing market economies could import 80 or 90 million tons of grain. Aid will not fill more than a small part of the gap and if efforts were made to import the remainder, the impact on income growth in the developing countries would be so severe as to dampen the expansion of demand for grain.

I do not want these last remarks to set a pessimistic tone. I am confident that it is possible to increase the growth rate of grain and food production relative to the growth rates of the past two decades. I say that recognizing that the production performance of most developing economies from approximately 1950 to 1970 was a very good one. At a compound annual growth rate of 2.6 percent, it takes but 27 years to double output.

But, I believe that even a fairly cursory examination of the agricultural resources of the developing economies and of the available scientific knowledge indicates that past achievements can be exceeded. Grain yields are low in the developing countries. But, they are increasing and have now reached levels equal to those of the industrial countries only a quarter of a century ago. After all, increasing grain yields is a recent phenomenon in the industrial countries. I can see no resource or biological reasons why grain yields in the developing countries cannot reach and surpass yields now obtained in industrial countries. The basic scientific knowledge exists to make this possible. Up to the present, that knowledge has not been supplied to a sufficient degree to contribute significantly to the solution of the food production problems of the developing countries. We now have examples to indicate that when sufficient effort is made results can be achieved, not just at experiment stations, but on farms in many parts of the developing countries.

To achieve the required increase in the rate of growth of food production to improve nutrition in the developing countries will

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require more resources than are now being devoted to agriculture in these countries. Needed are improvements in irrigation, adequate supplies of modern farm inputs, storage facilities that will protect crops once harvested, and a major increase in the resources devoted to research. The nine international research centers are only a beginning. In 1976, the total expenditures of the eight operating centers was \$65 million. While this represents a very great increase over the past few years, the expenditure is about an eighth of the public expenditures on agricultural research in the United States. The Japanese public expenditure on agricultural research for less than 6 million hectares of crops is now more than the total expenditures for the international research centers to serve all developing countries.

Increased resources and improved technology or methods of production are important for achieving the potentials for increased food production in the developing countries. But those of us who are interested in increased food production in the developing countries have for far too long been silent or talked too softly about the adverse effects of national agricultural and trade policies. It is not only the adverse effects of the policies of the developing countries which should be addressed; we should also consider the policies of the industrial countries that inhibit the effective development of food and agricultural production in the developing countries.

In the space that I have available, only a few examples of policies that have an adverse effect upon food production can be given. But there are many, many others.

The developing countries depend on agricultural products for a very large percentage of their export earnings. One nearly universal feature of the developing countries is an overvalued currency. This acts as an export tax since the value of an exported product in the domestic currency is less than what the value would be if the currency were valued at its equilibrium level relative to other currencies. The overvaluations are frequently of a large magnitude. The recent devaluation of the Mexican peso from 12 to the U.S. dollar to nearly 20 to the U.S. dollar is not an unusually large devaluation.

An overvalued currency means that imports are subsidized. Obviously, it is not possible to indirectly tax exports and subsidize imports. Very soon the value of imports will exceed the

value of exports and foreign exchange reserves will be exhausted. Consequently, various measures must be used to limit imports. Among the imports that may be limited are those important to increasing agricultural output—fertilizer, pesticides, and herbicides. In any case, the decision concerning what should be imported and on what terms becomes a political decision rather than a decision based on the real value of the imports to the economy.

The overvaluation of the currency is not the only method used to discourage production. Many developing countries impose export taxes. A recent report of the Comptroller General of the United States lists 19 developing countries that impose export taxes upon one or more agricultural products.<sup>1</sup> Thailand was one of the countries with an export tax on a major food grain, rice. In his doctoral dissertation, Chung Ming Wong has estimated that the export tax has reduced the production of rice in Thailand by as much as 1.5 million tons, or nearly 15 percent.<sup>2</sup> The loss in foreign exchange earnings averaged about \$250 million for 1966-70—equal to nearly 5 percent of annual national income.

Another output-discouraging measure is the control of domestic prices for the benefit of consumers. Export taxes reduce domestic prices and the use of price ceilings and subsidized imports can have the same consequence. For the past 15 years, India has followed a policy of holding the domestic price of rice below the world price. Vasant A. Sukhatme found that for 1967 through 1972 (the period of rapid adoption of the new rice varieties), the domestic wholesale price of milled rice averaged 25 percent below the unit value or price of imported rice. This relationship existed even when the official rate of exchange is used in the comparison.<sup>3</sup> Since the rupee was significantly overvalued during this period, the real domestic price of rice might have been as much as 50 percent below the world price. During the same period of time, the internal price of wheat in India, after correcting for the overvaluation of the rupee, was very close to the world price—perhaps 8 percent above. Dalrymple estimated that, in 1974-75, almost 62 percent of all wheat planted in India was to high-yielding varieties; only 30 percent of the rice was in high-yielding varieties.<sup>4</sup> Mr. Sukhatme's research indicates that a large part of the difference in the adoption rates and levels for the high-yielding varieties of rice and wheat was the result of the dif-

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ferential price treatment.<sup>5</sup> It is not obvious that the Indian consumer will gain in the long run from a policy of *cheap* rice.

It is not clear why the governments of developing countries so frequently follow policies that obviously discourage food production. One reason may be that too many officials still accept the erroneous stereotype that poor and poorly educated or illiterate farmers do not respond to economic incentives. If this stereotype were correct, it would be possible to exploit farmers for the benefit of urban consumers without any significant cost. But the evidence can be found almost everywhere, if one only looks.

But those of us who live in the industrial countries are not without considerable responsibility for policies that adversely affect agricultural production in the developing countries. We follow policies that reduce the export earnings of the developing countries. Almost all of the industrial countries have or have had sugar policies that encourage production where costs are high and limit consumption due to unnecessarily high retail prices. Industrial countries often pay export subsidies on products that compete with the exports of developing countries. We have tariff structures that make it virtually impossible for the developing countries to carry out the first processing of their agricultural and other raw products. We do this by having a low, perhaps even a zero, tariff on the raw product and what may appear to be a very modest tariff on the first processed products. But the modest tariff on processing may result in protection of 100 percent or more for the processing activity.<sup>6</sup>

If a developing country were to significantly expand its beef production and generate an export surplus, it would be virtually impossible to find a market for that export surplus. It could not be sold to the United States, Japan, the European community, or in any significant and dependable amount to the Soviet Union.

We in the industrial countries should not be too surprised that the developing countries follow policies that have adverse effects upon food production and development of agriculture. They have only to look to the industrial countries to find a model for almost everything they have done. It is true that the industrial countries have often subsidized agriculture rather than penalized it as has been the case all too often in the developing countries. But, the agricultural income and price policies of the industrial countries have not been significantly more effective in achieving their objec-

tives than have the policies followed by the developing countries. And the industrial countries can take little pride in their record of insensitivity evidenced by their willingness to impose many of the costs of their internal agricultural adjustment upon other countries, including the developing countries.

### **International Grain Prices and the Developing Countries**

At one point in my efforts to develop this paper, I had thought of bringing my crystal ball out of the closet and making some projections of the future of international grain prices. What, in fact, occurs with respect to the general level of international grain prices over the next few years is going to have a major impact upon U.S. agriculture, on the future developments of our agricultural policy, and upon the food supply of the developing economies.

I decided against making such projections. There were two important reasons for this decision. First, while I am strongly of the opinion that the high international prices of grains and other agricultural products that existed in 1973 and 1974 were a temporary phenomenon and not likely to be seen in the near future, I do not have strong grounds for choosing between a continuation of approximately the current real level of grain and feeding material prices, and prices that might be as much as a fifth or a quarter lower. There are very substantial differences between these two possibilities in terms of the likely political and economic responses. Second, in terms of my recent preoccupations, I thought it more interesting to speculate upon the effects of relatively low grain prices upon the food supply of the developing countries. Given that I think there is some significant probability that international grain prices might return to real levels not far above those of the early 1970's, it seemed reasonable to speculate whether the circumstances of the developing countries would be improved or worsened.

I do not want my remark that there is some probability that international grain prices might return to real levels not far above those that prevailed in the early 1970's to be taken too literally. There are some rather persuasive reasons why the prices would

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not fall that low and remain there. The international prices during the early 1970's were depressed by a number of factors, including the overvaluation of the Canadian and U.S. dollar, the cash transfers that were being made to producers of grains in the major exporting countries, and the price effects of the gradual elimination of surplus-producing capacity in the United States and Canada.

If the trend of grain prices in the international markets is downward to a level that is not significantly above the prices that prevailed prior to mid-1972, after adjustment for inflation, will this be a favorable factor in improving the food situation in the developing countries? In my opinion, the answer to the question is mixed with there being some favorable effects and some unfavorable effects. On balance the unfavorable effects could outweigh, though they need not, the favorable ones.

The actual or presumed favorable effects are relatively obvious. The developing countries that import grain, either continuously or when domestic crops are adversely affected, would have a relatively assured supply at quite low prices. In addition it would be highly likely that, with relatively low grain prices, the volume of food aid would increase significantly from recent levels, and the foreign exchange outlays required to pay for grain imports would be further reduced.

However, while low grain prices might have some short-run benefits to developing economies that are net grain importers, the net impact on foreign exchange earnings on all developing countries would almost certainly be adverse. While the net grain trade balance of the developing countries is negative, these countries are net agricultural exporters. And, it is not hard to believe that, if international grain prices move close to the early 1970 levels, the prices of other agricultural products will follow relatively soon. However one views it, the developing countries as a group obtained a substantial increase in their net foreign exchange from agricultural products due to the increase in prices from 1972-74.

During 1966-70, the net export surplus of all developing countries for agriculture and forestry averaged \$9 billion annually. For 1972 through 1974, the export surplus for these categories of commodities was, respectively, \$11 billion, \$12 billion, and \$17 billion. These data include the OPEC countries. If the OPEC countries are excluded, the 1966-70 export surplus of agricultural



**"We are likely to make exactly  
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and forestry products would have been unchanged at \$9 billion and, for 1972 through 1974, the developing countries' export surplus of agricultural and forestry products would have been \$12 billion, \$13 billion, and \$19 billion, respectively.

An analysis of 23 developing countries, including only Indonesia of the OPEC members, was undertaken to relate the changes in the value of net trade in cereals to the total of agricultural trade. These countries had a total population of 1.3 billion in 1972. For 1969-71, these 23 countries had a net annual surplus in their agricultural trade of \$7.5 billion; in 1974, the net surplus was \$15.4 billion. The net deficit in cereal trade averaged \$308 million for 1969-71 and was \$2,427 million in 1974. A significant part of the increased deficit in cereals trade was due to increases in quantities imported rather than to price changes. If Thailand and Argentina are excluded from the cereals trade data, the annual net deficit in cereals trade in 1969-71 was \$1 billion; \$3.8 billion in 1974. Even with this adjustment, for which there is no particular justification, the net surplus for the 23 countries was in excess of \$14 billion in 1974.

A significant decline in grain prices, especially if it is accompanied by a general downward drift of other agricultural prices, could have an adverse effect on food production in the developing countries. For example, the impact of reduced foreign exchange earnings would affect imports of materials and equipment important for increasing agricultural production.

But I think what might be called the indirect effects of low international grain prices could be much more serious in impairing food production growth in the developing countries than the more direct effects. Further significant declines in grain prices and the rebuilding of grain reserves would be all too likely to result in both a false perception of security and a loss of the sense of urgency concerning the numerous changes that are required if there is to be a significant improvement in per capita food supplies in the developing countries during this century.

If I were asked to indicate what I felt was the most serious of the world food problems, it would be that during the next few years neither the industrial countries nor the developing countries will give adequate attention to the problems of increasing food production in the developing countries. We are likely to make exactly the same mistakes that were made after 1966. The rela-

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tively large grain crops in the developing countries from 1967 through 1971 and the low levels of international grain prices during those years resulted in an unwarranted sense of euphoria. The *Green Revolution*—the introduction and rapid adoption of the high-yielding varieties of wheat and rice—left the mistaken impression that the food problems of the developing countries were solved or would be solved in due course by a continuation of present efforts and policies.

If the 1976 grain crop in the developing countries is somewhat larger than the very good 1975 crop, the improvement in per capita grain production in those 2 years compared to 1972, 1973, and 1974 will be approximately the same as the improvement in 1969 through 1971 compared to the poor crop years in the mid-1960s. As cruel as it may sound, the poor people of the world might be better off in the years ahead if the 1976 grain crop is no better than last year's. A very good grain crop this year will make it easier for policymakers to continue with business as usual, emphasizing those projects and undertakings that have more glamour and prestige than the slow and difficult process of increasing food production.

But low grain prices and favorable current food supplies in the developing countries would also influence policymakers in the industrial countries. Low grain prices would make it politically difficult for the major grain exporters to provide assistance for increasing grain production in the developing countries when such aid could result in grain exports from some countries and significantly lower grain imports by others. The major industrial countries that are grain importers may be reluctant to assist in expanding grain and food production in the developing countries since low international prices will increase the pressure upon some of the grain importers to reduce their import barriers on grain and other food products.

My emphasis on grain prices in the international markets should not leave you with the conclusion that a primary source of improvement in food supplies in the developing countries could or will come from increased grain imports. As I think is now generally recognized, most of the growth in demand for food and grains in the developing countries must be met by their own expanded production. In the previous few minutes I have tried to indicate why I am concerned that what might ordinarily be per-



ceived as a net benefit—low grain prices—might turn out to have adverse consequences for the growth of food production in the developing countries.

It needs to be recognized that the level of grain prices in international markets may fail almost entirely to indicate an improvement in the per capita food supplies of most developing countries. Grain prices can return to levels near those of the early 1970's largely as a consequence of developments in the industrial countries. If Western Europe increases the protection of agriculture and expands its grain and livestock production to achieve near self-sufficiency in these products, and if the Soviet Union effectively utilizes its own agricultural resources and learns how to handle its instability problems and once more becomes at least self-sufficient in grain and feed, international grain prices will be low regardless of how well or how poorly food production is progressing in the developing countries. An enormous import shortfall for grain has been projected in some quarters. The financial capacity of the developing countries to import grains is limited. Other adjustments will be needed to bring demand and supply for food into balance.

I will conclude this part by noting that it will require substantial political maturity and wisdom by the policymakers and citizens of this country if we are to make a significant contribution to the improvement of nutrition in the developing countries in the years ahead. It will be all too easy for voices to be raised claiming that low international grain prices, if they should occur, were due to the expansion of grain and food production in the developing countries. And the response to those voices, if they are loud enough and frequent enough, would be all too likely to withhold access to the enormous scientific and organization resources that we could provide if we had the will to do so. The recent attempts to reduce or eliminate financial assistance, largely by international agencies, for the development of palm oil production is a sharp reminder of how quickly attitudes and concerns can change.

### **A Food Aid Program**

The time has come for Americans and others in the industrial countries to reconsider the objectives served by the types of food

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aid programs that now exist. There is at least an intellectual disillusionment with food aid usually administered as an important instrument of economic growth. While certain humanitarian impulses remain and motivate many of us, there is increasing uncertainty concerning the degree to which food aid, except under quite special circumstances, serves to significantly limit human suffering. The large-scale food aid programs of the United States arose primarily as a substitute for domestic agricultural resource adjustment. As the years went by, food aid was used to a considerable degree to support certain quite specific political and military objectives. I am not implying that such use was either immoral or inappropriate; most of the other reasons for large-scale food aid had little to commend them. Recent legislative action has significantly restricted the use of food aid for such geopolitical reasons, though hardly entirely eliminated such use.

I wish to offer a proposal for a U.S. food aid program. The program has an identifiable objective and, in my opinion, has almost none of the disincentive effects of most of our food aid efforts. The food aid program would replace most of our existing efforts, though I would not argue that it should be our only food aid effort—only our major effort. We should continue to use food aid to assist in real emergencies resulting from natural disasters such as floods, storms, and earthquakes. In this use of food aid, perhaps the most critical element is our capacity to deliver food and other aid in relatively large quantities on short notice. There may be gains from food aid to support school lunch programs and special feeding programs for vulnerable groups such as pregnant and nursing women and preschool children. Food aid, in limited quantities, may have a value to the recipient equal to a money transfer in connection with some projects such as land development and farm resettlement. If so, there is no particular argument against a food aid component of general economic assistance.

But most of our food aid falls outside these types of efforts. In fact, most of our food aid consists primarily of long-term and low-interest credit sales that amount to a substantial export subsidy for sales to certain countries. While I have not recently analyzed the terms of these credit arrangements, a few years ago the aid component amounted to approximately half of the market value of the exports involved.

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**"My proposal...a grain insurance program."**

My proposal for a food aid program, which I have called a grain insurance program, is a very simple one. To any developing country wishing to participate the United States would offer to meet all annual shortfalls in grain production from trend in excess of a given percentage. Except for the limited forms of food aid described earlier, this program would be the primary form of food aid that we would provide. The cost would not be beyond our means. If we covered all shortfalls below trend production for grain in excess of 6 percent for each developing country, the average annual payment would be approximately 5 million tons. If a developing country held even very modest stocks of grain or reserved foreign exchange to import limited amounts of grain, the largest annual shortfall in grain consumption could be held to 3 percent or less. The 6-percent criterion is admittedly quite arbitrary, though not entirely so. The selection of the percentage criterion should reflect two considerations: the incentive to hold some grain reserves in the developing country, and the effect of the insurance payments on the output behavior of the local producers. If the percentage were very low, say between 1 and 2 percent, there would be no economic incentive for holding reserves. Furthermore, if such small departures from trend were met, the magnitude of the grain transfers would be large enough to significantly reduce the average expected returns to the local producers and thus lower the rate of growth of domestic grain production.

The examples that we have worked out indicate that, with modest resource commitments by the developing countries, annual shortfalls in grain consumption could be held to very low levels with a program meeting all production shortfalls in excess of 6 percent. For example, between 1968 and 1974, if India had had an optimal grain storage program and had stored during that period 12 million ton-years of grain, consumption would have fallen below trend in only 2 years—by 1 million tons in 1972 and by 4.9 million tons in 1974. The latter shortfall was approximately 5 percent and could have been reduced to 3 percent by importing 2 million tons of grain. A similar exercise was undertaken for Africa and similar results were obtained even though grain crops were poor in both 1973 and 1974. The total grain transfer for the 7 years would have been 4.3 million tons for India and 5.4 million tons for Africa.

Many developing countries suffer from substantial year-to-year

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variability in grain production. Since grain accounts for up to 70 percent of the total calories consumed in many developing countries, fluctuations in grain production result in variable food consumption. The grain insurance program would provide a substantial degree of food security for each of the developing countries. It would permit countries to take greater risks in their efforts to expand food production in the full knowledge that if there were adverse production effects, human suffering would be minimized.

I have said that the grain insurance proposal is a simple one. Obviously, there would be complications. Grain production estimates for many developing countries leave much to be desired in terms of accuracy. Some have argued that the existence of such a program would induce governments to falsify their production data. This is obviously a potential problem with all food aid programs. But since the insurance payment is related to trend production, lowering grain production estimates would affect future payments. Unfortunately, this attribute would not be of overwhelming importance to a government that had a relatively short life expectancy, as is the case in numerous developing countries. But one of the conditions of the insurance program could be that outside observers would be permitted to evaluate the accuracy of the grain production estimates.

The grain insurance program represents a means by which a limited form of economic aid could be provided to the developing countries. With reasonable management of domestic supplies of grain by the developing countries, the insurance program should eliminate most of the undernutrition and hardship associated with grain production variability. The program would contribute very little to the long-run problems of inadequate food supplies for the poorer people of the developing countries. But I do not think any food aid program, even a massive one, can contribute to long-run improvement in the food supplies of the poorer people of the world. Such people are going to have better diets only as economic growth occurs and food production expands.

What can be said for the insurance program is that it would not interfere significantly with efforts of developing countries to expand their own food supplies. The negative incentive effects, both upon governments who have in the past relied upon massive food aid as an alternative to measures to expand domestic production and upon farmers who have been adversely affected by

previous food aid programs, would be very small. But I believe the grain insurance program is responsive to an important problem that exists in many, if not most, developing countries and it would make the world a somewhat more secure place for millions of poor people.

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<sup>6</sup> D. Gale Johnson, *World Agriculture in Disarray*. London: Macmillan, 1973, chaps. 11 and 12.



# The Political Economy of Natural Resources Policy

M. M. Kelso

Lecture 7  
November 9, 1976

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This special adaptation of Dr. Kelso's Bicentennial Year Lecture was prepared by Clark Edwards and originally published in the April 1977 issue of *Agricultural Economics Research* (Vol. 29, No. 2).

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As I look back on our natural resources history, I see only plenty. People, with their accumulated knowledge and capital, were the restraints on our advancing welfare, not natural resources. True, there has always been, at each moment in time, an economic margin restraining increased economic use of space, land, timber, forage, water, ores, coal, petroleum, and air. But advances in technology always saved the day so that natural resources never became a restraint.

Technological changes bearing directly on available resources occurred in (1) exploration and discovery and (2) access to and extraction of discovered and known resources. These changes have been overshadowed by technological changes that indirectly increased productivity of labor and capital. It has become an article of faith that technology will always save us.



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The socio-political-economic institutions concerned with natural resources, and the sociocultural system of values and relative preferences we evolved, exploited these natural resources. No harm in that, so long as resources were abundant. But that abundance began to change to scarcity during the first decade or two of this century. The changes broadened slowly and increased gradually between the two great wars and then accelerated markedly. Yet, as recently as 1963, Professors Barnett and Morse, in a trenchant book that greatly influenced me and my students, argued that natural resources were not then and will not for a very long time, if ever, be constraining on growth or welfare.<sup>1</sup>

Barnett and Morse related their optimism only to the supply of marketable goods and services derived from nature. They argued that the "quality of life" could—and probably would—be affected adversely, particularly by space and energy shortages. As Norgaard<sup>2</sup> says, "We are neither so naive nor confident today. The environmental crisis, the Arab oil embargo, and the subsequent



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reanalyses of our resources, technologies, and institutions have swept us over an awareness threshold toward the economics of the coming spaceship earth.<sup>3</sup> (W)e have not developed satisfactory methods of adjusting our actions in light of this now widespread consciousness. ...(O)ur concern over scarcity and growth today is based on the long-standing issue as to whether we are developing technologies as fast as we are depleting high-grade resources."

Increasing scarcity in the U.S. economy of space, energy, water, and air, ubiquitous in their influence on all production and consumption of material goods and services as well as on the quality of life, is in prospect because of the following:

1. A continuous growth in population numbers together with accelerated change in their distribution among urban, suburban, and rural geographic regions.

2. A rapid and accelerating rise in per capita real incomes, especially among the lower and middle-income classes.

3. An accelerating rise in the levels of technology applied to the direct conversions, hence, consumptive use of natural resources in the production of marketable material goods.

4. An increase in demands for marketable material goods; services and amenities derived directly from natural resources; energy; and the direct services of land, water, and air as dumps for unwanted end-products.

5. A relatively slow rate of change in the technologies or relative preferences that save or expand space, that save or increase energy, or that increase the waste recycling or absorptive capacity of air, water, and land.

These changing conditions generate several broadly distinguishable kinds of socioeconomic problems. First, there is an increase in rents (input costs) for space, energy, water, and air. Rents rise because of scarcity, opportunity costs as demands proliferate, and increased domestic dependence on uncertain foreign sources.

Second, accelerating rates of depletions of particular natural resources may, in turn, generate immediate or long-range increases in resource rents through changes in quantity, quality, accessibility, or location.

Third, rising resource rents shift the distribution of real incomes and wealth toward the middle and upper economic classes.

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Fourth, existing institutions and the rules of the game generally presuppose *free* to *low-cost* resources, and they even may be designed to insure that resources will remain free or low cost to their private sector users or managers despite rising social costs.

Fifth, low private (relative to social) costs may (1) cause resources to be exploited too rapidly and too broadly for optimum social gain, and (2) result in sunk investments (fixed costs, frozen assets) that will hinder conversion to resource conserving systems.

Sixth, after hundreds of years of gradual change (Webb refers to it as the "four hundred year boom"<sup>4</sup>), we have suddenly crossed Norgaard's "threshold of awareness." Problems are emerging faster than the system is able to adjust. We resist the problem of natural resource development by ignoring it, by refusing to see even when shown, by praying for deliverance, and by awaiting a crisis too severe to ignore with its attendant *ad hoc*, crash responses.

It would be typical for us to undertake economic analysis of emerging natural resource problems by applying conventional economic wisdom. That wisdom presupposes: an infinite supply of whatever resource may be in question, or an infinite supply of perfectly substitutable other resources; today's structure of socio-politico-economic institutional environments—or worse, perfect competition and perfect markets; the current relative preferences for resource products and services among consumers; a projected rate of technological change; a projected rate of population growth; an objective function designed to maximize a uni-dimensional welfare goal. From such a conventional model, analysts can, given adequate data, project the growth of GNP (sometimes accompanied by observations about the related growth of amenity services), the growth of GNP per capita, and possibly the distribution of GNP (and possibly of amenities) among socio-economic classes. Doesn't that sound splendid?

But its splendor is a mirage, for we will be of little help to resource policymakers. We will have assumed away the problem. We will imply that whatever is, is both good and right subject only to considerations as to the adequacy of knowledge. We will be saying to policymakers: all you need do is ensure that the channels of communication to resource managers and consumers are functioning adequately in order to *fine tune* natural resource

**"It seems we must always be  
dragged kicking and screaming  
into such a process."**

use and consumer products. Using the model, the economist cannot predict exact outcomes, quantify objectives, or weigh uncertainties.

Most economists know of the all-pervading presence of externalities: neither the resource manager nor the product consumer maximizes social good, even though both may be individually and collectively seeking the most productive combinations. The problem's source lies (1) in the institutions that surround resource decisionmaking and (2) the goals and preferences of society. The answer to the problem lies not in conventional economic wisdom, but in political economy, law, government, social psychology, and ethics.

The fact that the problem needs solution within a wide context does not mean that economists should be replaced as analysts of natural resource problems. The economic content of the problem dominates. But economists engaged in natural resources policy analyses must become political economists, or institutional economic analysts, or, at the very least, must be flanked with political scientists, lawyers, and social psychologists. We need to purposely engineer changes in our institutions and our goals and preferences. It seems we must always be dragged kicking and screaming into such a process.

Boulding asserts that policymakers do not take as their objective the maximization of some idealized social goal or unidimensional goal. Rather, "(policymaking) tries ...to proceed from day to day in a direction it perceives as 'up'—'up,' for some strange reason, meaning 'better'... It brings us closer to realism when we abandon the 'social goals' concept and concentrate simply on what might be called a 'dynamic evaluation function,' which is simply a way of trying to describe 'which way is up.' To those eagle-eyed soaring souls who want to base every action on some splendid glimpse of a distant glorious future, this may seem like chickening out. The awful truth is that most of us are chickens, not eagles."<sup>5</sup>

Boulding stands four-square with Professor Lindblom and "marginal incrementalism"<sup>6</sup> and Professor Wantrup and "safe minimum standard" in resource conservation policy.<sup>7</sup> Boulding concludes: "Fortunately for us, we have to leave most of these problems to our descendants. All we can really do is to wish them well, to leave them a little elbow room, and to guide our current

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evaluation functions somewhere toward the minimax of being on the safe side."<sup>8</sup>

We must shun policies that claim to lead our society over the one true path and substitute Boulding's concept of a "dynamic evaluation function," or what I would call an "up-function" or the strategy of "upmanship."

Marginalism can lead us into perverse processes in which society becomes progressively worse off. "...we must look beyond incrementalism to some kind of long-range vision that can penetrate the fog to permit us to view more distant summits."<sup>9</sup> We must hold some vision—or hope—of which route we think is up, even if we can't see it very clearly.

The institutions which guide economic change must incorporate feedback loops so that the system can learn from mistakes and adjust to change. The system can then make incremental corrections at those moments when the fog lifts enough to reveal error, or in which experience reveals that our course is actually downward.

This approach requires flexibility and reversibility. Preference must be given to institutions and policies that leave future options open. Incrementalism together with built-in flexibility and reversibility in resource policies and institutions really represent pleas to grant freedom of choice to future generations—freedom curbed by responsibility of each succeeding generation of analysts and decisionmakers.

Krutilla and others have considered the conceptual and methodological issues in analyses involving irreversibilities and uncertainties in natural environments.<sup>10,11</sup> Krutilla and Fisher explore the following question: when a pristine natural environment has two alternative uses, one extractive and the other amenity yielding, each alternative being destructive of the other, which use should be assigned to the site, when in time should it be assigned, and by what analytical methodologies can guidance to the decision be given? Choosing one alternative can close the option for the other. If you build a dam for water and power, you sacrifice amenity. If you open an ore body to gain minerals, you destroy a pristine wilderness. Krutilla-Fisher find the following issues crucial: asymmetric influence of technological change between commodity outputs and amenity services; impact of congestion on amenity services of pristine natural environments; and differing

economic costs of irreversibilities under uncertainty.

Their concept applies to any natural environment yielding an amenity service that (1) can be used only at the site, (2) can be destroyed by human beings if the site is used for commodity outputs, and (3) cannot be produced or, once destroyed, be reproduced by us.

The Krutilla-Fisher model, applied by them to a half dozen real world cases, revealed that the amenity alternative out-valued the commodity alternative in every case. Two flexibility costs vastly different in their impact on commodity compared to amenity production brought about this result. These costs are (1) the differing impact of technological change and (2) the differing costliness of reversibility. Reversibility will be cheap when shifting from the amenity to the commodity alternative. But it will be very dear, even infinitely costly, in attempts to shift from the commodity to the amenity alternative.

The Krutilla-Fisher analysis gives only passing and perfunctory attention to the changes in policy and administrative institutions that would ensure the amenity alternative would be evaluated in terms of opportunity costs it imposes on commodities.

Resource policy analyses consist primarily of descriptions of alternative sets of institutions whose function is to guide, as by an *invisible hand*, choices which will determine the content, purpose, rate, where, and for whom of economic activity. Resource policy analyses examine which institutions to leave unchanged, which ones to modify and in what way, and what new ones to create. Institutions in resource policy analyses cannot be silent. They must be explicitly in, even at the center of, the analytic system. That is why Professor Wantrup has referred to resources policy analysis as "applied institutional economics."

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<sup>4</sup> Walter Prescott Webb, *The Great Frontier*. Houghton Mifflin Co., 1952, pp. 13-28.

<sup>5</sup> Kenneth Boulding, "New Goals for Society," *Energy, Economic Growth, and the Environment*. Sam H. Schurr (ed.), Baltimore: Johns Hopkins Univ. Press for Resources for the Future, 1972, pp. 141-142.

<sup>6</sup> Charles E. Lindblom, "The Science of 'Muddling Through'," *Pub. Admin. Rev.* Vol. XIX, No. 2, Spring 1959, pp. 78-88. Also see: Robert Dahl and Charles E. Lindblom, "Politics, Economics, and Welfare," *Harper's Magazine*. New York, 1953.

<sup>7</sup> S.V. Ciriacy-Wantrup, *Resource Conservation: Economics and Policies*. Berkeley: Univ. Calif. Press, 1952.

<sup>8</sup> Boulding, *op. cit.*, "New Goals for Society....," p. 151.

<sup>9</sup> Kenneth Boulding, *Economics as a Science*. New York: McGraw-Hill Publ. Co., 1970, chap. 3, p. 67.

<sup>10</sup> John V. Krutilla, Charles J. Cicchetti, A. Myrick Freeman, and Clifford S. Russell, "Observations on the Economics of Irreplaceable Assets," *Environmental Quality Analysis*. Allen V. Kneese and Blair T. Bower (eds.), Baltimore: Johns Hopkins Univ. Press for Resources for the Future, 1972.

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# **Agricultural Production Economics In the Future**

**Earl O. Heady**

**Lecture 8  
December 1, 1976**

I have been asked to summarize needs and potentials in agricultural production economics for the future. Production economics, like market relationships, is not a scientific or academic field which comes and goes with the fads of time. Rather than fads, perhaps I should say contemporary problem areas. We do have problem areas which arise because particular economic events, historic developments, or professional interest give rise to them at a particular point in time. Often they represent societal or economic problems which must be solved, sometimes with urgency; then, they may be laid aside for other areas. Examples of these contemporary problem areas include the allocation of housewives' time, energy usage in agriculture, specific environmental impacts, and others.

Agricultural production economics, while not listed by name in the organizational chart of ERS, is a major field of graduate study, research, and education in the Nation's system of land-grant universities. As a conventional field in agricultural economics, along with agricultural marketing, it has the greatest number of graduate majors and transactions in the job market. As a research subject, it tends to be a highly quantitative field



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and extends over a broad area stretching from micro to macro models and analyses. Perhaps for these reasons there tends to be considerable occupational migration from this field into general modeling, agricultural policy, economic development, and related fields. The economic and quantitative base of the field facilitates these transfers and evidently has kept the demand for new Ph.D. degrees in the field from becoming saturated.

Production economics, again as with the market sector, represents a set of basic relations which extend through time and are reflected in contemporary problem areas as they arise. These basic relationships, in either an optimizational or behavioral context, themselves define problem sets and information or relationships which need quantitative reestimation somewhat continuously over time as factor and product markets, technology, and institutions change. As basic relationships, they also serve as the constructs for quantitative solution of contemporary problems.

Thus, production economics will remain a basic field of agricultural economics. In contrast to the groupings which have resulted from ERS reorganizations, most of the State universities still retain agricultural production economics and farm management as a distinct major field of study, research, and extension. In its groupings, ERS has attempted to emphasize problem areas. This emphasis is needed, no less in State universities, in an applied field of economics where the ultimate objectives of society's investment is the solution of problems. The latter organization more nearly parallels the question "here is a problem; which are the tools that will best answer it" than its opposite of "here is a tool, where is a problem which will illustrate its use." This distinction does not depreciate the importance of theoretic concepts and quantitative models or persons specialized to them. Instead, it emphasizes their importance in problem solutions. The concepts, relationships, and models of production economics not only reflect quantities to be estimated for purposes of explaining conditions of optimization or behavior, but also serve as tools in solutions of problems which are defined by other means. The market for agricultural production economists has been extremely brisk in recent years and openings in many universities have gone unfilled due to an insufficient supply of new Ph.D. degree holders. Job descriptions for these positions typically emphasize simultaneous ability in problem identification and quantitative methods.

An ongoing strong demand in this field is expected as the highly commercial farm strata continues to strengthen. Most all States now have a sizable group of advanced and well-educated farm managers on a continuous quest for knowledge to help optimize, finance, and expand their operations. This demand for services of agricultural economists is even likely to accentuate as farms continue to increase in size and decrease in numbers and as agricultural structure adapts, for example, to powerful and expensive 4-wheel drive tractors and conforming equipment. This is an opportunity and prospect which excites many production economists because it especially calls for more complex models and computer applications. And while it is an intellectually exciting opportunity, it also has its dangers. Scientists from various disciplines and fields frequently are engaged on impact studies for the Environmental Protection Agency (EPA) or other government agencies. Perhaps, an equally interesting study could be made by economists of the impacts of their own research on



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groups other than the target group to which their results are initially directed. I believe hints also were directed to this complex by speakers at the 1976 AAEA meetings who suggested that those conducting micro studies should follow through on the expected macro outcomes. I believe that concentration solely on highly capitalized farms which press for and utilize the results of advanced modeling not only stands to accentuate the development of these farms but also to cause disadvantages to fall on smaller farms and rural communities.

This interest of highly commercial farms in economic outcome and analyses has helped cause animal scientists, agronomists, and other technical scientists to attempt to understand and apply what they term systems analysis. The interest and activity is becoming widespread. However, what these groups term systems analysis is more or less a synonym for economic analysis. They would embrace orthodox marginal analysis or linear programming as readily as conventional systems simulation. Add these research resources to the growing number and capabilities of production economists and further impetus is provided to the highly capitalized and large farm that wishes to accentuate these characteristics. However, it also provides a widening opportunity for cooperative efforts between economists and technical scientists. This demand of other scientists to have economists work with them currently is vigorous in many States. Some 15 years back, I conducted several production function studies with animal scientists. These studies went somewhat unnoticed by the mass of animal scientists until recent times. Now a swell of interest has developed around these approaches, almost as if a whole new world of concepts and research opportunities had opened up. I expect that use of interdisciplinary teams for the problems of commercial farms will accelerate in the future. Unfortunately, the physical separation of economists and technical scientists (or even other social scientists) serves somewhat as an obstacle for ERS personnel in engaging in these joint activities.

At the firm and subfirm level (the latter representing the system of interest to most technical scientists), optimization or simulation models developed and applied to guide managerial decisions for the future should be kept current and ongoing. In other words, research will not result, as was typical at earlier times, in a single publication which represents the end of the research activ-

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**"...does continued application of the model...represent research?"**

ity. The model developed will be under continuous updating so that new data for a farm, or data of different farms, can be plugged into it continuously over time to provide a stream of solutions or results. This type of activity is already underway in several States and is partly represented by the FEDS budget generator of ERS. These activities provide very useful results for farm decisionmaking and for use by other educational specialists and research workers. For example, we have found the FEDS budgets of great use in our own research program. However, especially for models directed at repeated use to aid farmer decisionmaking, this question can be raised: does continued application of the model with additional data for other farms, or the same farm in another year, represent research? Or, is it more of a service and extension activity? My inclination is to classify it as a useful activity of the latter group. For these purposes it is an activity which might best be carried by the extension services or private firms. There is much greater need than in previous times for joint appointment of extension personnel to some research time. The research portion might be used for the updating and extension of developed models, with the extension portion allocated to their continued application as aids in farmer decisionmaking. This complex is, of course, a more pressing problem in land-grant universities. There is little linkage need or opportunity between ERS and the Federal-level Extension Service in developing models and communicating their output to farmers.

My reference thus far has been to micro models. The same question might be raised about more aggregative or macro models. Numerous groups in universities, private consulting firms, and even ERS are engaged in developing or financing models which expectedly will be kept operational for user groups within and outside their organization. In some instances, the funding agency requires, as a necessary condition for a grant, that a research team provide continuous user services for other groups. This allows the harvesting of a larger crop from the investment in a given modeling activity. However, I again question whether the repeated application of models for others in itself represents a high-order research activity. It is a service or extension activity paralleling that mentioned earlier for the farm firm and might best be conducted by the equivalent of an extension service or private firm.

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The overwhelming majority of models developed to aid farmer decisions has been static and deterministic in nature. Recent and prospective market developments, both for products and factors, have greatly increased price volatility and the uncertainty surrounding agriculture. Occurrence of corn blight in 1971 and more variable demand and weather conditions in the 1970's than in the 1960's and 1950's adds to this uncertainty. There is need for a greater development and application of stochastic models that can aid farmers' decisions under these conditions. Less emphasis has recently been given to uncertainty phenomena as it impinges on resource use than at earlier times when the choice of quantitative approaches was slimmer.

Partly in linkage with the uncertainty problem is the production potential of the Nation's agriculture. It has two important facets with respect to research.

First, if concerns over the world food situation continue, one problem is to better estimate what our food supply capacity actually is under various conditions of technology and land and water use. What is the economic feasibility of converting the 264 million acres of land identified in the conservation needs inventory to Class I and II cropland? This is a large amount of land relative to that already cropped, if its productivity can be quantified adequately. Is it likely, as has been suggested, that per acre productivity advances in agriculture are in prospect of plateauing? If so, the conversion of even 100 million acres of this land could, in the short run, serve as an important substitute in maintaining supply growth. We need to know much more precisely the investment which would be required to bring this land into production and the supply price for food produced on each strata of it. Of course, there is an important question of how intensely we need to be concerned about supply growth. If growth in exportable surpluses finds its way mainly as livestock feed to rich countries, the basis for concern perhaps need not be great, except as it keeps our balance of payments and related domestic affairs in an improved state. If the grain is produced mainly to go to richer countries, let those countries take care of it and encourage its production through the market price they will pay for feed grain. If, on the other hand, the goal is that of getting more food to the world's hungry and poor people, and if extra market institutions can be developed and implemented to accomplish this task, then we need

to be concerned in a thorough researching of the production and supply possibilities.

The second research facet, and the linkage back to the farm's uncertainty problem, then, relates to the policy means by which the hunger of the world's poor can be translated into effective demand and which will provide prices at levels and with sufficient stability that U.S. farmers can profitably produce at the maximum. There has been much talk about all-out food production by U.S. farmers so that the world food gap can be closed. But the mere existence of 500 million hungry people does not translate into prices and an economic environment calling for U.S. farmers to convert potential Class I and II land into crops. The uncertainty of the market for this added output is too great. Even aside from any attempt to feed this mass of undernourished people, the magnitude of future export demand through commercial markets is highly uncertain. Most estimates indicate that U.S. supply capacity likely is sufficient to meet export demands expressed through the market (supposing world institutions are not created to link world hunger to production possibilities through the market or otherwise) under normal weather conditions.

Prices can even be depressed during such periods in relation to the high cost structure which has now been capitalized into agriculture. As they have in recent years, prices will shoot upward as crop shortfalls occur in major world regions. In the presence of this price volatility and uncertainty, stochastic decision models developed for and applied at the micro level can be useful to a limited extent in improving decisions and encouraging greater output for world purposes. Mostly, however, reduction of this uncertainty must come through grain reserve policies based on research which indicates their optimal size, location and acquisition, and release rules. The variety of models and answers we are now getting suggests that the research task is not finished. While more of both are needed, research to establish optimal grain reserve policies is a potentially more powerful alternative in reducing the uncertainty surrounding volatile exports and commodity prices, and in increasing U.S. resource conversion and supply response (if it is, in fact, needed for world purposes) than are farm decision models.

Related to the uncertainty complex surrounding agriculture is that of capital demand and farm financial and estate manage-



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ment. With the great inflation in farmland and farm equipment prices, and the advent of a new generation of large-scale machinery revolving around the 4-wheel drive tractor, the farming aspirant must have access to or be related to a near millionaire. Unfortunately, it seems to me that not enough research is being done on credit supplying and financial alternatives for individuals with different capital supplies and who do not stand to inherit a farm of multimillion dollar value. In fact, the momentum of land-grant university specialists in this area may be in quite the opposite direction; that is, the concentration on models, legal alternatives, and information directed toward family corporations, financial arrangements, and estate planning procedures which lead to even larger and fewer farms. While this is a positive effort on behalf of one strata of farms, we have little parallel activity on the behalf of younger and smaller farmers whose center of financial concern is not that of the magnitude of inheritance taxes. While the nonfarm corporation is posed as an evil giant standing over agriculture ready to snatch away its control, with legislative threats and extension programs organized accordingly, the more exact threat to the structure of agriculture (in farm size and numbers, capital, labor ratios, etc.) is in the very large-scale family farm which grows even larger. Much more research needs to be concentrated on, say, the 240-acre Corn Belt farm (or the equivalent elsewhere) which has few plans or opportunities to grow larger. To an important extent, our ongoing research and extension programs are neglecting these families.

In these respects we need more research paralleling the study in ERS by Pat Madden a few years back. It suggested that the major cost or scale economies were attained with farm sizes falling far short of the level to which the largest of commercial farms now seem headed. Research in this realm could be tied in with and help revive the thrust of rural development activities. This opportunity ought to be explored, especially in light of recent information on backward migration from urban centers to the more rural areas.

One of our initial studies showed larger and fewer farms to be associated with lower aggregate farm income, smaller total input usage, and reduced nonfarm employment in rural areas as compared to a structure of smaller farms. Of course, income per farm is much higher and supply prices for agricultural commodities are



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**"Greater farm prosperity has not...solved the problems of eroding rural towns."**

lower with large farms. Two elections back, it seemed that every Presidential, Congressional, and Senate candidate had rural development as a major platform plank. Farmers, too, plugged for rural development programs—more or less equating them with higher support prices and greater farm income. With the recent upward burst in farm income, commercial farmers have fairly well abandoned interest in rural community welfare.

Greater farm prosperity has not, however, solved the problems of eroding rural towns (and their attendant problems of transportation, recreation, and other services). Front burner problems have become those of energy, land prices, environmental controls, and urban encroachment on farmlands and other contemporary issues as these impact on the farm firm while stemming from outside variables such as international markets, the level and structure of national economic development, and city growth. Currently, public programs are either posed or in the process of legislation in relation to these and other areas where there is either strong competition in land and water uses or externalities in the use of a particular resource. Before programs and restraints relating to these problem areas are legislated and implemented, more studies need to be initiated which measure fully the economic impacts in the farm firm. For example, EPA can, by edict, abruptly specify the types of inputs and farming systems which can or cannot be used. As these edicts are applied, the farmer stands to bear the major costs of environmental improvements through reduction in income. We need to know these costs better and to be able to identify those for which society should compensate him.

Perhaps there are two distinct categories of environmental restraints, one qualifying for farmer compensation and the other not. For farming practices representing inputs long in use, the consuming public has not previously told the farmer he must abstain from their application. To the contrary, the consuming public's market mechanisms and indications have encouraged use of, say, a particular chemical. The resulting income stream has been capitalized into resource values accordingly. Now, if the input is condemned and farm income and resource values decline, compensation from the public seems entirely appropriate. There is an opposite case, however, where compensation does not seem justified. If a new input is developed which promises greatly

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increased yields at low costs but has a larger potential negative environmental impact, the farmer who has never used it sacrifices no loss in income or asset value if it is condemned or prevented. Thus, compensation seems justified in the first case, if we are to be sure that the sum of utility over farmers and nonfarmers is not lessened. But it is not required in the second case because the farmer realizes no sacrifice.

A further reason for firm studies to measure impacts is that of redistributions of income and resource values within agriculture resulting from public programs. In existing and posed legislation, EPA has the potential power to limit land use technology and systems so that runoff and sedimentation is restrained to target levels. However, such measures can have opposite economic impacts for farmers at different locations. For example, to limit soil loss to 5 tons per acre annually can greatly restrain alternatives in farming and reduce income in areas of the Southeast where rain is abundant and soils are erosive. In contrast, similar restraints do not fall on areas of the Corn Belt and Great Plains where land is level, rainfall is limited, and an erosion hazard does not exist. In addition, because the supply potential of the first region is restrained, the latter regions can gain through improved market price.

Differential economic impacts also can occur under policies which restrain energy use in agriculture. Legislation has been requested and outlined which would reduce energy use by either higher prices or rationing (although, except for a Middle East flare-up, this is not an immediate prospect). While all segments of agriculture would be affected by either alternative, some stand to be impacted much more negatively than others. For example, irrigated agriculture is much more energy intensive than conventional rainfed farming and bears a major share of economic impacts related to reduced energy use.

At an earlier time, ERS had a fairly complete set of typical farms for which it kept up-to-date data over a long time period. These analyses were used to give a historical and contemporary indication of the input, expense, and income structure of farms in different regions of the country. Initially, this work was done by the hand and desk calculator procedures common to budgeting techniques. Later, some shift was made to computerization as linear programming models of typical farms were used in trying to

predict farm response to various facets of government supply control and income support programs. To my knowledge, these efforts now lie in abeyance. However, given the existence and further prospects of restraints in farm resource use, either through public edicts or pricing policies, a reinstitution of a typical farm activity on a national level could be beneficial for several reasons and groups.

Whereas the previous generation of farm extension economists were biased toward resting on their own in-state farm account summaries for farmer guidance, the younger current generation—with many being zestful model builders and users—would readily utilize (and cooperate in construction of) a national set of typical farms. Also, as suggested above, this activity could be used to indicate the prospective impact of public regulations and policies on farm income, supply response, and related phenomena. It thus could indicate the differential nature of economic impacts and suggest where public compensation is due. An activity of this type would be highly complementary with the ongoing FEDS project which provides production costs for a wide range of enterprises and locations. While the costs can be related to price support levels, should the time return when target prices again become effective, they also provide basic information for programming models of typical farm situations to evaluate the impacts of various public programs.

### **Price Support Programs**

Rather than relate price support targets to production costs at future time periods, I would prefer target levels related to farm income of selected farm types. We may ask whether the time will ever again return when farmers will need or press for price supports or supply controls. Have we not gone through a period of record farm income which will be perpetuated into the future under an ever-increasing export demand? While this is the conventional wisdom in some quarters of agriculture, and even if it does prove to be largely true, it does not eliminate the prospects that farmers will demand price supports and related programs in the future. Corn Belt farmers who paid \$2,500 per acre for land when corn was \$4.00 per bushel will claim that surpluses exist

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when corn price prevails at \$2.00 per bushel—as certainly as their fathers requested price supports for corn at \$1.00 grown on land for which they paid \$500 per acre. Because of the high price level now capitalized into agricultural resources, along with the Nation's potential supply capacity, I expect to see periods of pressure for price supports even with continued high exports (unless, as mentioned previously, world organizations are able to develop and implement institutions which can convert the hunger of poor people over the world into effective demand).

In addition to payment limits, however, it seems to me that there is considerable consensus that income rather than price should be supported on a deficiency payment basis for typical family farming operations. The level and amount of these payments would best be based on typical farm studies over the Nation extending beyond the FEDS enterprise budgets. While the call for price supports will come because farmers have paid \$2,500 per acre and up for good corn land, or the equivalent for land of other qualities and crops, I see no reason why society should help them capitalize these speculative prices into land values forever. Hence, tying price supports to any level of costs gives rise to a question of which costs—variable costs only, some normal level of land costs plus variable costs, or what combination?

As mentioned earlier, several speakers at the 1976 AAEA meetings pleaded for persons engaged in micro studies to extend their analyses to macro impacts. While agreeing that this linkage is needed, I have been emphasizing also that policy implementation and analyses often could be improved by extending research to the firm or micro level. I believe this need will become even more apparent as future policy needs arise and as society places more restraints on agriculture through environmental, energy, water, and related resources or conditions.

### **Macro Relationships**

Production economics historically has involved a set of macro studies. Early examples were represented in somewhat empirically crude attempts to delineate types of farming regions in terms of their comparative advantage or expressed supply responses (e.g., some types of farming regions produced milk, some cash grain or

fruits, others pork and beef, etc.). Later, with quantitative tools much less powerful than currently exist, a massive supply response and comparative advantage study for milk over the Lake States and New England was inspired by Sherman Johnson and J. D. Black. This was an extremely large undertaking in light of the research technology then available; namely, farm budgeting techniques implemented through desk calculators. It included farm firm response estimates which were aggregated into regional supply functions. Some three decades later, ERS cooperated with the North Central and New England States in somewhat parallel studies emphasizing dairy, pork, beef, and closely competitive products. A somewhat parallel methodology was used; namely, firm estimates aggregated into State or regional responses. However, the technology had now shifted to linear programming models and computers. ERS launched a fairly large-scale project of its own along these lines. But with erosion of personnel and interests to other areas, it seems to have faded away. Similarly, while there was intense methodological interest and some quantitative application of econometric supply response estimates in the 1950's and 1960's, this interest also faded away some years back.

Still, if the basic world food problem is eventually taken seriously, there will be upcoming need for more systematic supply response estimation. Time series econometric models can be useful in predicting real world responses of farmers to commodity and factor prices and whether, and how, these may be changing with the structure and growing commercialization of agriculture. Generally, time series estimates of supply are conservative relative to the potential supply capacity of agriculture. Hence, we may need to return to the normative firm models in which programmed responses are weighted into more aggregative responses. These models would need, if world food need potentials were the basis of concern, to consider those lands not now cropped which have the production potentials of Classes I and II land. Especially we would like to know the supply prices involved if production is carried to successive levels. The world's ability to produce food does not follow a supply function which is horizontal at the outset, as often implied, but vertical at some posed capacity as often implied. Rather the ability is still large depending on the supply price that consumers can pay for food (or which some world institution is willing to pay for them). With wheat and corn at

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\$10-12 per bushel for an extended period of time, we could have much more food available for human consumption—both through employment of more land for crops, a more intensive use of that now cropped, and through a reallocation of grains from livestock to people. (Who, of course, is to supply the resources or the rate of economic development which will allow the world's poor to bid these prices is another question.)

While we may not need to go quite this far in assessing U.S. farm supply potentials, there is need to review knowledge of our supply capacity and response in relation to both export capability under normal commercial markets and somewhat volatile export demands and potential contributions to world food supplies. We have been engaged for some years in developing and applying a system of programming models which allows these types of estimates on an aggregative regional basis. We, in fact, started this as a cooperative project with ERS, which withdrew from it in a fairly early stage. However, we are again engaged in cooperative effort with ERS and did so in a large-scale basis in analysis for the National Water Assessment. These are somewhat long-run models in the sense that they assess production potentials and supply prices on a basis of regional (rather than firm) restraints. They do allow reflection of regional possibilities, comparative advantage, and resource capabilities. All output, however, also can be summed at the national level. (One model included 150 regions, 3 land class groups in each region, and 3 farm types in each class.)

Many national econometric and simulation models are now in the process of being, or have been, developed. Largely, these provide outcomes and trade-offs only at the national level. Generally, too, they include market and other sectors as well as a producing sector. From the standpoint of State use, it would be convenient if these models could be disaggregated to provide results at least by the major producing regions of the Nation (if not by States or areas within them). ERS with its proximity to and availability of the data base is the appropriate place to locate such simulation models. While they cannot be built overnight, modeling and computing capacities now are sufficient to allow these models which can then have important educational and other uses in the States, as well as policy uses at the national level. These regionalized models appear feasible and perhaps only await time for imple-



mentation. This call for the disaggregation and partitioning of national simulation models so that they also provide State or regional results is a needed counterpart of the call for extension of micro models in order that their macro implications can be better associated.

### **The Aggregation of Fields**

It was suggested that I speak on some potential or needed developments in production economics. As is apparent, I look upon this general field as a broad one encompassing all aspects of production and resource use as related to agriculture. It was for this reason that some 25 years ago I titled one of my books "The Economics of Agricultural Production and Resource Use." I did so because a common set of economic concepts and quantitative methodologies surround the analysis of production and resource use in agriculture. These concepts and tools can be more useful and productive if they are not restricted to just one subset of phenomena such as farm optimization in agriculture, estimation of commodity supply functions, or research in resource economics. The distinction between arbitrarily defined fields of specialization in agricultural economics is now largely disappearing as graduate training in the various universities becomes more generalized in the application of basic economic principles and quantitative methods to the peculiar problems of agriculture or sectors allied closely with it.

Somewhat, as is reflected in the organization of ERS, the task ahead is more typically that of amassing sufficient manpower and skills around a particular problem area so that its many facets and particular data needs can be surrounded. Modern modeling activities and computer facilities allow large-scale quantitative undertakings which can link together the various levels of aggregation and sets of economic relationships which previously had to be studied in isolation. More group or team research will be needed in the future if possibilities in linking commodities and resource sectors, or micro and macro relationships, or regional and national aggregations, or other groups are exploited in a manner which can now be productively accomplished. Research groups were less needed in earlier times because data and com-



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putational procedures could not accommodate models of as many dimensions and such large scale as at the present. Many economic philosophers and model builders will continue to be most concerned with individual research activities where the individual person is the research entity. However, for those problems and interlocked fields where the challenge is to more fully exploit modern research capabilities (especially in extending models incorporating many subsectors and computer capacities, in producing results never before possible in providing real world answers), a research team approach will be necessary just to complete all facets of model quantification necessary. But it also may be necessary for incorporating all of the disciplines and subdisciplines necessary to implement and exploit modern modeling or research opportunities.

In the early years of our profession, particularly in such fields as farm management and commodity marketing, a new study completed in one State resulted in a repetition of this study in other States. While the local conditions were different, the methodology and general findings were often the same. These repetitions could be carried out with respect to current day problems and quantitative alternatives, and just a bit of this is happening. For example, by the end of the year we may have a dozen groups in as many institutions analyzing the optimal size of grain reserves for the United States. Since solution of some problems is so urgently needed and because certain of the models needed to surround other problems are large, we perhaps need a greater degree of specialization and cooperation in the Nation's agricultural economics research effort. Thus, rather than a half dozen econometrically based simulation models at six institutions for the purpose of analyzing domestic farm policies, we likely would be better served by a couple which are able to surround sufficient manpower and other resources to effectively develop and use such models and to make them available to other institutions and persons.

How a pooling of resources or a sufficient degree of specialization might be accomplished to allow such efforts, however, poses a question yet to be answered. Regional research projects of the State agricultural experiment stations generally do not provide the mechanism because they have a financing and planning horizon which is too short. Groups of universities do not have the

flexibility in use of State funds to concentrate such efforts in one State. Also, in their attempts to encompass so many fields and subfields within agricultural economics, individual States typically cannot concentrate large-scale resources around major problem areas and thus conforming quantitative methodology. ERS perhaps is the single institution with sufficient professional manpower to accomplish this degree of specialization and concentration within its own organization. However, this larger pool of manpower might also be used partly to aid specialized concentration on major problems and quantitative models in individual States. This could be accomplished if the ERS field staff was spread somewhat less thinly over many States and concentrated more at centers of specialization.

ERS, much more than any other institution, has a large enough staff to have important influences on the quality, trends, and methods of agricultural economic research. One such opportunity has been cited, but others also are obvious. Hopefully, ERS might back off and, in light of its very sizable manpower supply, evaluate the greater impact it could have on the agricultural economics profession. The opportunity to lead the profession is, I believe, greater than is being practiced.





